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COLEOPTERA
LAMELLICORNIA.
(CETONIINÆ AND DYNASTINÆ)

BY

G. J. ARROW.

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EDITOR'S PREFACE.

The Cetoniinæ and the Dynastinæ are two of the smaller Sub-families into which the large Family of Scarabæidæ is usually divided.

The Cetoniinæ are in the main an Old-World Group, comparatively few species being found in the New World: this is especially true of South America. They are well known for the brilliancy of their coloration and for the beauty of their form. The Rose-Chafers of Great Britain are familiar examples of this Sub-family.

There is, however, no representative of the Dynastinæ in Great Britain, and hardly a dozen species in Europe. They are, as this volume shows, distinguished by the possession of horns and projections on the head and prothorax, the use of which is still a matter of speculation rather than of observation.

In this volume Mr. Arrow deals with perhaps less than one-sixth of the great "Series" of Lamellicornia—Beetles which are economically important, many of them doing great damage to all sorts of crops, both above and below ground. They further present many unsolved biological problems associated with the exceptional exuberance of their colour, pattern, armature, etc. It is greatly to be desired that the Author should be able to continue his most efficient work on other Families and Sub-families of this "Series."

In issuing this volume, I have again to express my gratitude to Mr. Guy Marshall, who has helped in every possible way in the preparation of the manuscript for the press, and I am happy, with the approval of the Secretary of State for India in Council, to add his name to the title-page.

I wish also to thank Mr. Arrow for the great care which he has taken in the preparation of his manuscript for the press, care which has materially lightened the labour of the Editors.

A. E. SHIPLEY.

June 1910.

AUTHOR'S PREFACE.

In issuing this first volume upon the Lamellicorn beetles of India it is a pleasure to acknowledge my great indebtedness to the many institutions and individuals who have given generous assistance by allowing the use of types and other specimens, without which the work would have had little value. Type specimens have been lent to me by the Museums of Paris, Berlin (National Entomological Museum), Vienna, Copenhagen, Stockholm, Zürich, Oxford, and Calcutta, and for these my thanks are due to M. Pierre Lesne, Herr Sigmund Schenkling, Dr. Ludwig Ganglbauer, Dr. Adam Böving, Prof. Yngve Sjöstedt, Herr Hans Wagner, Prof. E. B. Poulton, and Dr. Nelson Annandale.

I must also render grateful thanks to Mr. O. E. Janson for the loan of many types from his splendid collection and for affording me the advantage of his special knowledge of the Cetoniinæ; to M. René Oberthür for putting at my disposal the resources of his museum; to Herr Sternberg, who has generously presented to me for the British Museum the types of Indian Dynastinæ in his collection; and to Capt. Moser for kindly sending me for examination types in his possession. Mr. H. E. Andrewes has given invaluable assistance both from his own collection and by his unflagging efforts to stimulate field-work in India; and Messrs. H. L. Andrewes, H. Maxwell Lefroy, E. E. Green, and Capt. A. H. Weld Downing have made important contributions of specimens

and observations. I cannot refrain from acknowledging, in addition, my indebtedness to Mr. Guy A. K. Marshall, whose most careful revision has led to the detection of various errors and omissions which would otherwise have passed unnoticed, and whose constant helpfulness and careful attention to the final stages of the work have contributed considerably to the appearance and completeness of the volume.

In conclusion it may perhaps be pointed out that in this and every other branch of Entomology the field open to workers in any and every part of the Indian region is still enormous. An effort has been made to include in this volume all that is at present known upon the subject of the Indian insects with which it deals (it is hoped with approximate success), and something will have been accomplished if it serves only to convey some idea how slender is the sum total of that knowledge and how greatly the value of future volumes of this series may be increased by the co-operation of those who, by residence in India, are in a position to supply the raw materials.

GLOSSARY OF TECHNICAL TERMS.

Names of parts of the body explained in the anatomical diagrams at the beginning of the volume are not included here.

♂ indicates the male; ♀ the female.

Apex, apical, the distal or outer extremity of a part.

Callus, a rounded prominence often occurring near the shoulder and apex of each elytron.

Carina, a ridge or keel.

Castaneous, having the red-brown colour of chestnut.

Caudal, tail-like.

Cephalic, belonging to the head.

Compressed, flattened in the vertical plane.

Coriaceous, having a finely roughened surface.

Costa, a rib-like elevation.

Depressed, flattened in the horizontal plane.

Digitate, bearing several finger-like processes.

Dorsal, belonging to the upper side.

Excavate, hollowed out.

Fascia, a transverse bar of irregular outline.

Granulate, bearing fine closely-set elevations.

Imago, the final or mature stage of an insect.

Lamella, a leaflet of the antenna.

Lamina, laminate, in the form of a thin plate.

Larva, the primary active stage of an insect.

Onychium, the rudimentary joint at the end of the claw-joint of the foot.

Opaque, dull, not reflecting light.

Oval, elliptical and not evidently more pointed at one end than the other.

Ovate, in the form of an ellipse more pointed at one end than the other.

Oviposition, the deposition of the egg.

Piceous, black with a red tinge.

Pubescence, a clothing of soft hairs.

Punctate-striate, bearing lines of punctures in parallel grooves.

Punctulate, bearing very minute pits or impressions.

Puncture, a small pit or impression.

Pupa, the penultimate stage of an insect.
Reflexed, bent back.
Reticulate, bearing a network of interlaced lines.
Rugose, having an irregularly wrinkled surface.
Rugulose, having a more finely wrinkled surface.
Scape, the first or basal joint of the antenna.
Seta, a minute short hair or bristle.
Setigerous, bearing setæ.
Sinuated, describing a varying curve.
Sinuation (elytral, of CETONIINÆ), the lateral excision of the elytron.
Spur, the movable spine (one or two in number) at the end of the tibia.
Striate, bearing parallel scratches or grooves.
Striate-punctate, bearing parallel lines of connected punctures.
Strigose, bearing fine scratches in different directions.
Striolate, bearing short scratches or linear impressions.
Sulcate, bearing parallel grooves.
Suture, the meeting line of two adjacent edges (especially of the two elytra).
Testaceous, having the yellow colour of tortoiseshell.
Truncate, ending abruptly, as if a part had been cut off.
Tuberculate, bearing small sharp elevations.
Variolose, bearing shallow rounded pits.
Ventral, belonging to the lower surface.
Vitta, a short longitudinal mark.

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INTRODUCTION.

LAMELLICORNIA.

The Lamellicornia form one of the best defined and most readily recognisable of the primary divisions of Coleoptera. No transitional forms linking them with any other group are known, so that, although their precise origin and relationships are obscure, their limits and characteristics can be fixed with precision. They are found in every part of the world and about 15,000 species have been named and described, of which about 1300 belong to the Indian fauna. No systematic collecting has ever been undertaken in this enormous and diversified area, and the above number must in time be very largely increased.

The beetles of this superfamily are of a primitively fossorial type, *i.e.* their fundamental structure has been determined by burrowing habits which to a greater or less extent still persist in the majority. They are generally very compact, with great muscular power, but without much agility, or grace of form or movement. In some groups this deficiency is counterbalanced by very brilliant or striking coloration, while the muscular development of the head and thorax and their appendages, and the remarkable outgrowths which often occur upon these parts of the body, produce some of the most strange and bizarre forms to be found in the Animal Kingdom.

Structure.

The chief distinctive feature of the Lamellicornia, as that name implies, is found in the structure of the antenna, which is short and consists normally of ten joints, of which the terminal joints, commonly three, but often more, in number, are flattened and elongated transversely so that a large part of their surfaces is contiguous. These lamellate joints are articulated together at one end and fitting closely in the resting position form an organ like a closed fan. The apposed faces of the fan-leaves are furnished with minute sensory pits and hairs which are freely exposed to the air by the slight separation of the leaves when the beetle is active, and protected when it is at rest by the closing of the organ. This structure gives a much larger proportionate sensory area than in simpler types of antennæ, and probably a higher degree of sensitiveness has accompanied the withdrawal of these delicate surfaces from the risk of contact with anything

external. In the family SCARABÆIDÆ the leaves or lamellæ are brought when at rest into close contact. In the LUCANIDÆ (e. g. *Heterochthes*, fig. 1) and PASSALIDÆ the adjustment is less perfect and the lamellæ less mobile, but in the last family (see *Aceraius* and *Passalus*, fig. 1) they are brought close together by a partial rolling up of the antenna. When a fan-like form of antenna occurs in other groups of Coleoptera, the structure of the

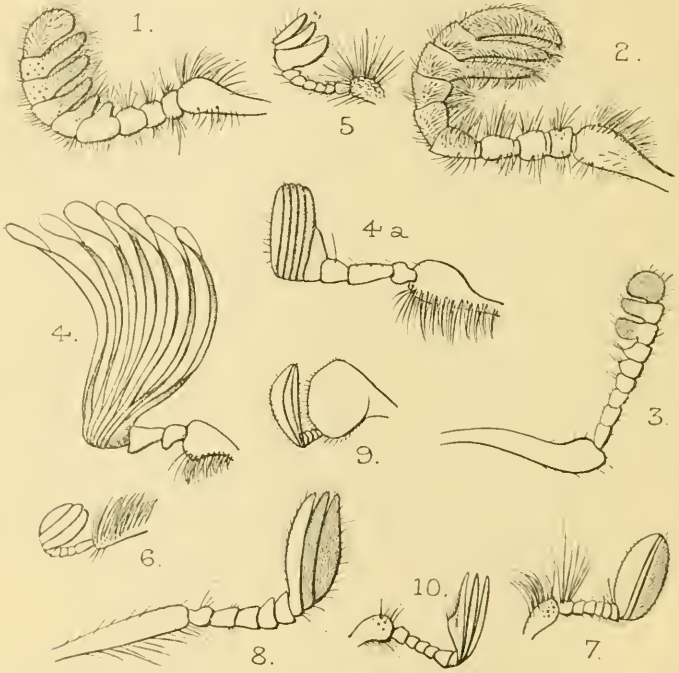

Fig. 1.—Antennæ of:—1. *Aceraius rectidens*; 2. *Passalus interruptus*; 3. *Heterochthes andamanensis*; 4. *Polyphylla fullo*, male; 4 *a*. ditto, female; 5. *Phæochroops opacicollis*; 6. *Trox indicus*; 7. *Bolboceras calanus*; 8. *Heliocopris bucephalus*; 9. *Callinomes bicolor*; 10. *Cetonia bensoni*.

joints is essentially different and there is no marked differentiation into footstalk and club.

In a few highly modified Lamellicornia the three joints composing the club have undergone a more or less complete telescoping one within the other, or are otherwise modified in such a way as to be no longer strictly speaking lamellate at all, but these are quite evidently derivatives of the typical structure and are very exceptional. One of the most highly modified of these derivatives is found in the genus *Lethrus*, belonging, strange to say, to the subfamily GEOTRUPINÆ, which is the only Lamellicorn group

(excepting one remarkable genus *Pleocoma*) having eleven joints to the antenna; though this is the normal number in most other Coleoptera.

The basal joint of the antenna is generally considerably larger than the rest, the second globular, and those intervening between that and the club small and one or two of them sometimes wanting. The antennæ are always placed far apart, immediately in front of the eyes, and beneath a ridge or brow which divides the eye in front and is absent only in the genus *Ochodæus*.

The form of these organs indicates that they are no longer tactile as in so many other insects. Various arguments have been used to show that the sense either of smell or of hearing is located in the antenna of beetles, and it seems likely that this highly developed organ of the Lamellicornia is the seat of both these senses, if anything really similar to the auditory sense of higher animals occurs in insects. Of this faculty we know little, but vocal organs are common although not general. There is little doubt, however, that an olfactory sense is universal and highly developed. M. Fabre has found that *Bolboceras* is able to locate truffles hidden below the ground, as pigs or dogs can do, but with still greater precision. He observed that the beetles would fly straight to a particular spot and, alighting, tunnel immediately downwards, and that beneath that spot a truffle, the natural food of the species, was invariably found. The antennæ frequently differ in the degree of development in the two sexes and, when this is so, they are always more highly developed in the male than in the female. The highest pitch of perfection is found in males the females of which are rather inert and degenerate, but there can be no doubt that the individuals of a species are able to find each other by means of an almost inconceivably delicate olfactory sense and that this sense is located in the antennæ. It is a familiar fact that the males of certain moths, the antennæ of which are pectinate (comb-like), while the females are inactive, are attracted from considerable distances to the latter, even when they are enclosed in dark boxes. Certain Lamellicorn beetles (e.g. *Pachypus*, *Clitopa*) have wingless females, which live beneath the ground and similarly attract the males, which fly in swarms to their burrows; and it is interesting to find that in these insects also the antennæ of the males are of the most highly lamellate type, while those of the females, like those of the female moths, are much simpler. That the means of attraction is a scent is shown by an incident recorded by M. Perris in Petites Nouvelles Entomologiques, 1874, p. 383. M. Revelière happened to observe in Corsica numbers of male *Pachypus cornutus* flying in a certain direction, and tracing them to their destination found the wingless female about a yard below the surface of the ground. This when handled squirted out a milky fluid which fell upon the sleeve of his coat and also upon an insect specimen previously placed in a box. Both this specimen and the coat-sleeve continued for several days to attract flights of the male beetles. There are other beetles,

nearly related to the Glow-worms, of which the females are grub-like and lethargic, with rudimentary antennæ, while the males have these organs of an extraordinarily highly-developed pattern. There is therefore good reason for the conclusion that the sense of smell is one of the principal properties, if not the only one, of the Lamellicorn antenna, and that the more elaborate forms of organ probably indicate the exceptional development of this sense.

The head is in almost all the Lamellicornia deeply sunk in the thorax in the position of repose, so that the eyes are partly withdrawn into the prothoracic cavity. In a few, however, the prothorax is so formed that the head can be folded beneath it, fitting against the projecting front coxæ and so completely enclosing the mouth and antennæ. There are yet others (ACANTHOCERINÆ) in which the prothorax itself can be folded beneath the abdomen converting the body into a ball, within which the tarsi, as well as the head-appendages, are enclosed.

The front part of the head above forms the clypeus, which is usually largely developed and sometimes assumes very peculiar forms. The brow ridge, or canthus, is sometimes very prominent and may be produced backwards, more or less completely surrounding the eye and dividing it into an upper and lower half, or forwards, forming a lateral continuation of the clypeus, to which in the COPRINÆ it is united at the edge.

The organs of the mouth vary enormously in different groups, according to the nature of the food affected. The mandibles of the COPRINÆ and most of the CETONIINÆ are soft and incapable of biting, but they are often large and very strong, and in the Stag-beetles (LUCANIDÆ) and some others attain an extravagant size in the male. In the PASSALIDÆ they are very stout and bear a movable tooth, a remarkable feature not found in any other insect. The maxillæ are generally sharp biting organs, but sometimes bear tufts of hair for absorbing and conveying to the mouth the juices which form the insects' food. The palpi of the maxillæ and labium are simple and short, the first consisting generally of four, and the second of three joints. The ligula is well-developed and chitinised in the LUCANIDÆ and PASSALIDÆ. small and fleshy in most of the SCARABÆIDÆ, and in the groups placed first in the present work reduced to a mere rudiment upon the inner face of the mentum. The mentum is enlarged in various groups inhabiting ants' nests, forming a shield which may coincide with the clypeus and completely concealing the mouth (*Cryptodus*, *Cœnochilus*, &c.).

Nearly all the Lamellicornia fly freely, although wingless forms occur, occasionally in both sexes but more frequently in the females. These apterous females are, as a rule, rarely seen and many of them are entirely unknown.

The legs assume a great variety of forms. The tarsi are five-jointed, except in a very few exceptional genera in which only four, or even three, are visible. These are partially degenerate insects living in ants' nests or in some other abnormal environment.

In the ball-rolling COPRINÆ, of which the well-known Sacred Scarabæus is the type, the front tarsi have completely disappeared. The front tibiæ are the principal implements for the manipulation of the dung of which the food-ball is made, and the tarsi evidently became an encumbrance and gradually atrophied. In other related genera, such as *Cheironitis*, the tarsus is absent only in the male, and

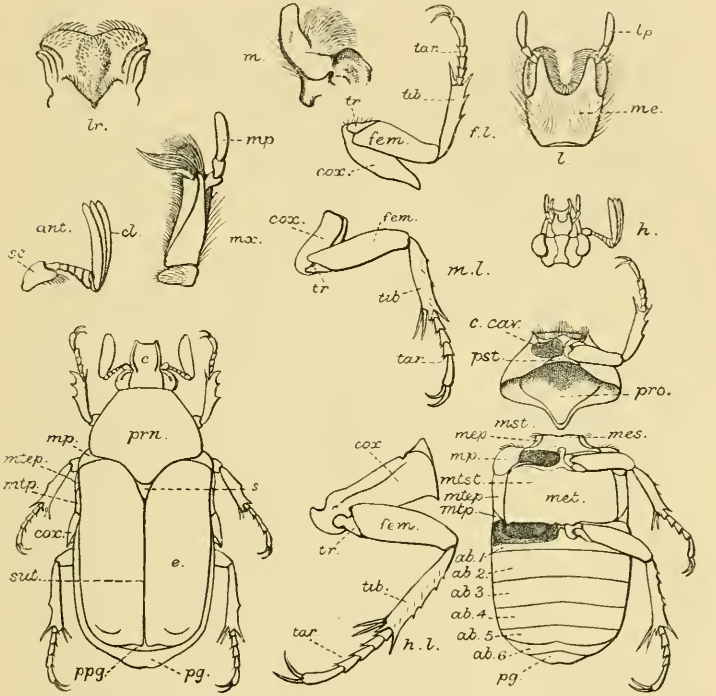

Fig. 2.—*Agestrata orichalcea* (Family SCARABÆIDÆ, Subfamily CETONIINÆ) and enlarged details:—*h.*, head; *c.*, clypeus; *pro.*, prothorax; *prn.*, pronotum; *pst.*, prosternum; *mes.*, mesothorax; *mst.*, mesosternum; *mep.*, mesothoracic episternum; *mp.*, mesothoracic epimeron; *met.*, metathorax; *mtst.*, metasternum; *mtep.*, metathoracic episternum; *mtp.*, metathoracic epimeron; *s.*, scutellum; *c. cav.*, coxal cavity; *ab.*, abdominal segment; *pg.*, pygidium; *ppg.*, propygidium; *e.*, elytron; *sut.*, elytral suture; *f.l.*, fore leg; *m.l.*, middle leg; *h.l.*, hind leg; *cox.*, coxa; *tr.*, trochanter; *fem.*, femur; *tib.*, tibia; *tar.*, tarsus; *ant.*, antenna; *sc.*, scape; *cl.*, club; *m.*, mandible; *mx.*, maxilla; *mp.*, maxillary palpus; *lr.*, labrum; *l.*, labium; *me.*, mentum; *lp.*, labial palpus.

present, but very minute, in the female. In these and all the groups whose members are generally found upon the ground the claws are quite simple and symmetrical, but they assume a great variety of forms in the groups of arboreal habits. They may be cleft or toothed in multitudinous ways, they may be fixed or freely movable, and one

of them may become reduced or entirely lost. The front claws in particular are liable to enlargement or other modification in the male. The tibiæ almost invariably show more or less adaptation for digging, a function which is exercised by the females, if not by both sexes, of nearly all the species. The front tibiæ bear a series of teeth along the outer edge, sometimes absent or modified in the

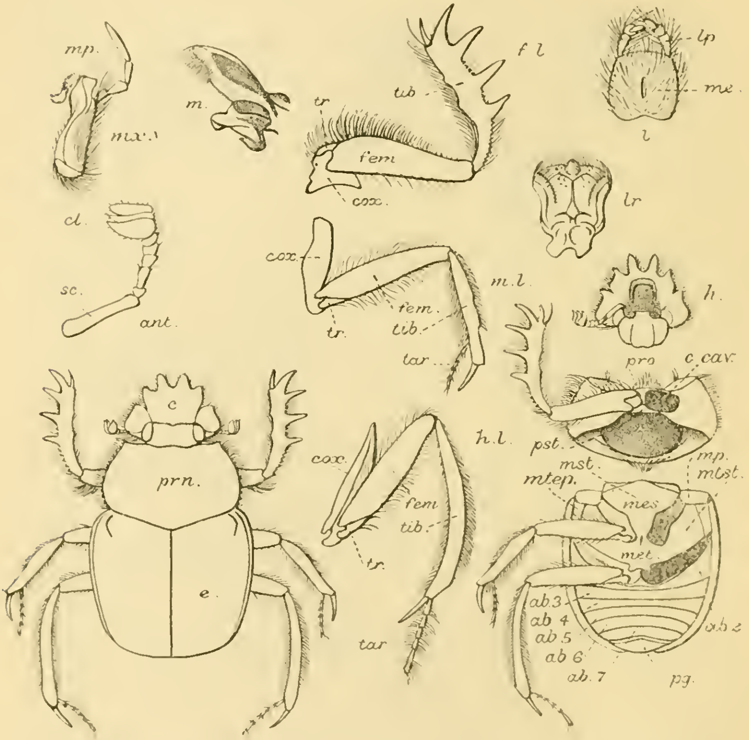

Fig. 3.—*Scarabæus sacer* (Family Scarabæidæ, Subfamily Coprinæ) and enlarged details:—*h.*, head; *c.*, clypeus; *pro.*, prothorax; *prn.*, pronotum; *pst.*, prosternum; *mes.*, mesothorax; *mst.*, mesosternum; *met.*, metathorax; *mtst.*, metasternum; *mp.*, mesothoracic epimeron; *mtep.* metathoracic episternum; *c.cav.*, coxal cavity; *ab.*, abdominal segment; *pg.*, pygidium; *e.*, elytron; *f.l.*, fore leg; *m.l.*, middle leg; *h.l.*, hind leg; *cox.*, coxa; *tr.*, trochanter; *fem.*, femur; *tib.*, tibia; *tar.*, tarsus; *ant.*, antenna; *sc.*, scape; *cl.*, club; *m.*, mandible; *mx.*, maxilla; *mp.*, maxillary palpus; *lr.*, labrum; *l.*, labium; *me.*, mentum; *lp.*, labial palpus.

males. There is a single articulated spine at the end of the front tibiæ and two at the end of each of the posterior tibiæ, except in the Coprinæ, where all are single. The femora differ little in form, but are sometimes modified in the males. The coxæ are usually large, the front ones nearly always, and the hindmost generally,

meeting in the middle line of the body. The front coxal cavities are completely closed and the prosternum sometimes forms an elevated process behind the coxæ. The mesosternum in many of the MELOLONTHINÆ, RUTELINÆ and CETONIINÆ is produced

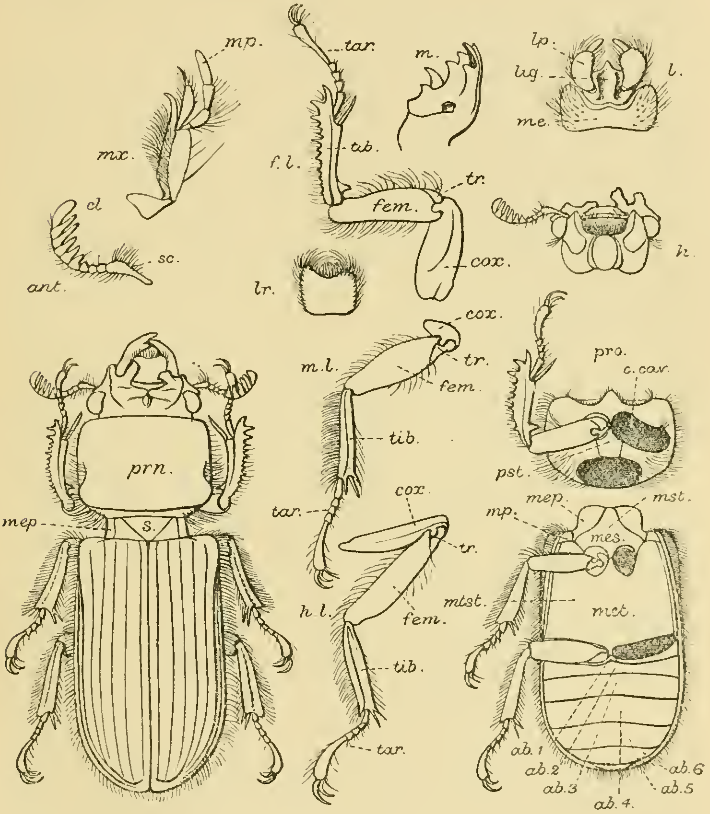

Fig. 4.—*Aceraius rectidens* (Family PASSALIDÆ) and enlarged details:—*h.*, head; *pro.*, prothorax; *prn.*, pronotum; *pst.*, prosternum; *mes.*, mesothorax; *mst.*, mesosternum; *mep.*, mesothoracic episternum; *mp.*, mesothoracic epimeron; *met.*, metathorax; *mtst.*, metasternum; *s.*, scutellum; *ab.*, abdominal segment; *f.l.*, fore leg; *m.l.*, middle leg; *h.l.*, hind leg; *cox.*, coxa; *tr.*, trochanter; *fem.*, femur; *tib.*, tibia; *tar.*, tarsus; *ant.*, antenna; *sc.*, scape; *cl.*, club; *m.*, mandible; *mx.*, maxilla; *mp.*, maxillary palpus; *lr.*, labrum; *l.*, labium; *me.*, mentum; *lig.*, ligula; *lp.*, labial palpus.

forward as a strong spine extending from the intermediate coxæ to the front ones, and the metasternum sometimes contributes part of this spine, the line of division between it and the mesosternum being faint or obliterated altogether.

There are as a general rule six visible ventral segments, but the intermediate articulations permit of little movement and may be completely soldered and even obliterated. The spiracles number two on each side of the thorax and seven on each side of the abdomen, the latter being entirely situated in the connective membranes in the Laparostict divison of the SCARABÆIDÆ and in part in the chitinous rings in the Pleurostict division.

An important characteristic of the Lamellicornia both in the mature and larval states is found in the concentration in the anterior part of the body of the central nervous system. In a typical insect this consists of a brain and a median ventral chord bearing a series of ganglia corresponding more or less exactly with the segments, one being in the head, three in the thorax and usually eight in the abdomen. In the SCARABÆIDÆ two or (sometimes) all of the thoracic and all the abdominal ganglia are found collected into a single mass between the first and second thoracic segments, the abdomen being supplied only by the lateral nerve branches given off in pairs from the posterior part of this mass. In the Lucanid larva the ganglia are distinct and form a chain, but in the adult beetles, although not massed together as in the SCARABÆIDÆ, they are reduced in number and do not extend into the abdominal region.* In the remaining Lamellicorn family, PASSALIDÆ, no part of the internal anatomy has hitherto been described and the condition of the central nervous system of larva and imago is shown in the accompanying diagram. In the larva the ganglia are all distinct and distant, the first three placed one in each thoracic segment, the fourth also accompanying the metathorax, while the first seven abdominal segments contain one each. In the imago a striking change takes place. The cephalic and first thoracic ganglia alone remain distinct, and all succeeding ones are massed together in a short rod-like body the hinder end of which reaches no farther than the point of origin of the second pair of legs. A pair of strong nerve fibres run from the extremity of this body into the abdomen and several other pairs arising before the extremity and running parallel with them indicate ganglia no longer separately distinguishable. Thus the Passalid larva, which externally has the most abnormal organisation among Lamellicornia, is entirely primitive in its nervous system, while the imago, which also is of a highly peculiar and isolated form, is in that respect almost identical with the SCARABÆIDÆ.

The internal anatomy of the Lamellicornia, as represented by the common European Cockchafer, *Melolontha vulgaris*, was the subject of the elaborately illustrated Monograph of Straus-Durckheim, published in 1828, "Considérations générales sur l'Anatomie Comparative des Animaux articulés," and later investigations have been collated by Professor Kolbe in his "Einführung in die Kenntniss der Insecten," 1893. The alimentary canal has been studied in many representative genera by

* Léon Dufour, Ann. Sci. Nat. (2) xviii. 1842, p. 162.

Mingazzini in his "Richerche sul canale digerente dei Lamellicorni fitofage."* Generally speaking, that of the larva is short and nearly straight, with its anterior part large and encircled by two or three distinct series of glandular sacs of varying form. Near the posterior end of the intestine there is usually a large dorsal cæcum in which part or all of the unassimilated contents of the stomach are, for a time, retained and which is often visible as a large dark mass through the semi-transparent skin of the last dorsal segment of the body. In many of the Coprinæ there is a remarkable dorsal hump apparently serving only for the accommodation of this cæcum. The contents form the material with which the cells occupied by the latter insects are repaired when necessary and of which in other groups the cocoon is chiefly or entirely made when the time for pupation arrives. In the Lucanidæ, and probably in some Scarabæidæ, this sac is little developed and in Passalidæ it is absent.

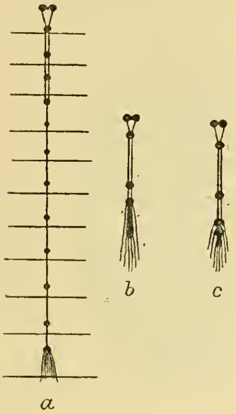

Fig. 5.—Diagrammatic representation of the central nervous system of *a*, larva of *Passalus* (Passalidæ); *b*, imago of the same; *c*, imago of *Goliathus* (Scarabæidæ).

In the adult beetle the digestive tube becomes very much elongated and convoluted. The changes which occur in *Cetonia* and *Melolontha* were described and figured by Ramdohr in 1811 (Abhandlung über die Verdauungswerkzeuge der Insecten). In the adult Passalid the intestine shortly before its termination is completely encased in longitudinal bands of very peculiar large spongy outgrowths which retain their form even in completely dried specimens.

Larvæ.

Lamellicorn larvæ are exceedingly similar and easily recognised. The body is long, more or less cylindrical and normally bent into the form of the letter C, the legs being well-developed and lying inside the curve. Although well-formed the legs are only used for locomotion in exceptional cases, as in the Passalidæ, the majority of the species lying always upon the side or back beneath the ground or in decaying wood, where they are surrounded by suitable food and need only slight powers of movement. Such movement as is necessary is performed chiefly by contractions of the body rings assisted by the erect bristles with which these are provided, and some larvæ when placed upon a flat surface invariably turn upon their backs in order to propel themselves along in that way. The head is large, very hard and set at right

* Mitth. Zool. Stat. Neapel, ix. 1889–91.

angles to the axis of the body, and the three thoracic segments are short, so that all the legs are brought close together near the head. The integument is stout but, except that of the head, not chitinous, and in the two posterior thoracic, and the first six or seven abdominal rings, is thrown into deep folds, generally three to

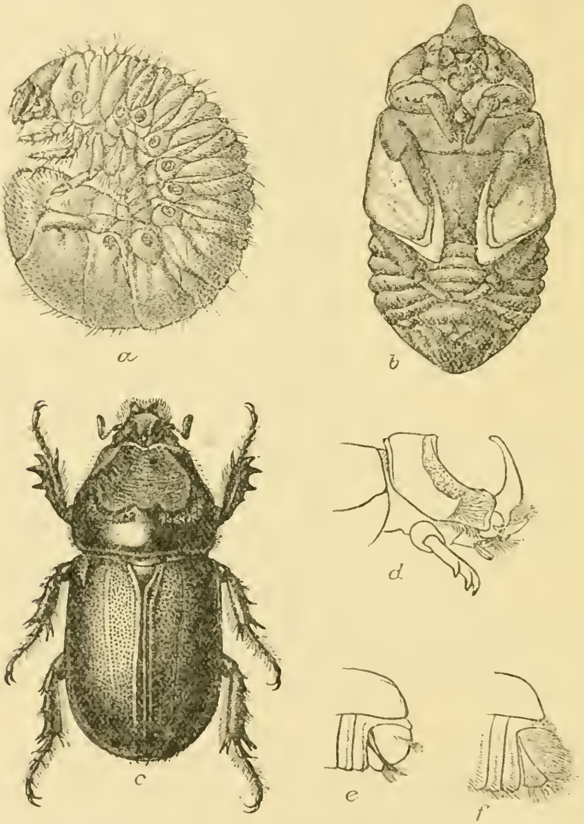

Fig. 6.—(*a*) larva, (*b*) pupa, (*c*) imago (male) of *Oryctes rhinoceros*, with lateral aspect of (*d*) head and thorax, (*e*) end of body, of male, (*f*) end of body of female.

each segment, but these are absent in the Lucanidæ, Passalidæ, and a few of the Scarabæidæ. The three or four last abdominal segments are very large and have the integument stretched to its fullest extent, smooth, and often partly transparent. In many Coprinæ a large hump appears upon the back as already mentioned.

Eyes are rarely found, but the antennæ are well-developed. They are generally slender and consist of four joints, but in the Passalidæ they are very short and consist of only two joints.

The front part of the head forms a small transverse clypeus, to which is articulated the flap-like labrum which lies upon the bases of the mandibles. These are strong and exposed. The maxillæ are fleshy, but generally bear strong horny teeth, and are of two types, terminating in a single lobe in the LUCANIDÆ and Pleurostict SCARABÆIDÆ and in two lobes in PASSALIDÆ and the remaining SCARABÆIDÆ. The labium is small and soft and carries a pair of small two-jointed palpi. Of the three thoracic segments the first alone has a pair of spiracles, and the first eight abdominal segments have each a pair. The back is studded with minute spines which produce a rough sensation to the touch and assist in progression, and probably also render the grub a less agreeable article of food. There is sometimes in addition a thin clothing of stiff hairs.

The leg consists of four joints, viz., a long basal joint, the coxa, a short trochanter, which is immovably attached to the third, the femur, and finally the tibio-tarsus, at the extremity of which is a single claw.

The larvæ of many typical genera of Lamellicornia were very carefully described and figured by Schiödte in Naturhistorisk Tidsskrift (3) ix. 1874, and other descriptions, together with a useful tabular statement, were published in 1875 by Perris (Ann. Soc. Linn. de Lyon, vol. xxii.).

Vocal Organs.

Lamellicorn beetles are remarkable for the variety of stridulating organs to be found amongst them and still more for the occurrence of these structures in the larvæ—a phenomenon which, so far as is known, is unique. They appear to be much more general in the larvæ than in the perfect insects, although fairly frequent in the latter, and when present in both stages it is always in entirely different parts of the body.

Although affecting a great variety of positions the organs are always of the same general type. A modification is produced of two parts of the body between which friction occurs in the ordinary movements of the insect and one of the modified surfaces bears minute and closely-ranged ridges or prominences of very hard chitin, capable of vibrating and so producing a shrill, more or less musical, note. They have been described in some detail in the Transactions of the Entomological Society of London, 1904 (p. 709).

In larvæ of CETONIINÆ, DYNASTINÆ and RUTELINÆ, an oval area is found upon the lower face of each mandible which when magnified is seen to consist of a number of regular sharp ridges placed close together and crossing the area transversely. Upon the upper surface of each maxilla, near the base, in a position corresponding to the ridged plate upon the mandible, is a row of sharp horny hooks, and these, by movements of the jaws, pluck the mandibular chords or ridges and so produce a faint high-pitched note. In some other groups of SCARABÆIDÆ (MELOLONTHINÆ and

Coprinæ) the mandibular ridges are represented by irregular tubercles and the apparatus seems comparatively imperfect. It has not yet been ascertained what sound, if any, is produced by these. In the larvæ of the Stag-beetles (Lucanidæ) a highly chitinised area appears at the base of each intermediate leg, and, when examined, this is seen to be closely studded with short pointed tubercles. If a living larva is held in the fingers it will be found to draw the hind leg sharply across this part of the preceding one and at the part of the former where the contact occurs may be seen another very hard chitinous surface. The trochanter is drawn out into a long straight file and its inner edge is provided with a series of microscopic sharp-edged ridges placed transversely. If the insect be held near the ear the vibrations set up by the friction of the studded plate against these ridges can be distinctly heard. In the genus *Geotrupes* (Scarabæidæ) sound is produced by similar means, but here the hind leg is considerably shortened and the joints appear solidified, while from base to tip runs a row of sharp horny teeth. Corresponding with these, the horny area at the base of the second pair of legs is furnished with fine close ridges, so that the functions of the two parts are reversed. The shrunken hind leg has quite lost its original function, for its direction is changed and it is inclined forwards, resting upon the preceding limb and always ready to make music. The last stage in this remarkable transformation of an organ of locomotion into one of vocalisation is found in the Passalidæ. The larvæ of this family are quite active, less unwieldy in form, and provided with better-proportioned legs than other Lamellicorn larvæ. The latter, however, seem to be only four in number. The last pair are so much reduced as to be scarcely visible without a lens, which reveals them in a form resembling tiny scales. These leg-vestiges are provided with several hooked claws at the margin or lower surface and lie close to the body upon a microscopically ridged plate like that of *Geotrupes* (fig. 7).

Fig. 7.—Larva of *Passalus*, and enlarged detail of part of middle leg and reduced hind leg.

In the adult Passalidæ the legs are all perfectly normal, and stridulation is accomplished by the friction between the wings and the upper surface of the abdomen. A small area upon each wing is studded beneath with peculiar hard short spines and against

these works a similarly specialised vibratory elevated area or boss upon each side of the ante-penultimate dorsal tergite. In the isolated and peculiar genus *Ochodæus* a similar but still more highly specialised structure is found at the same part of the back, in the form of a small, curiously sculptured club-like projection.

The LUCANIDÆ seem in the adult stage to be practically voiceless, a single South American species, *Chiasognathus granti*, being the only one known to stridulate—in this case by drawing the hind femur across a "milled" band at the outer edge of the elytron.

The only groups of SCARABÆIDÆ characterised by a single recurring type of vocal organ are the GEOTRUPINÆ and ORPHNINÆ, in a large proportion of which the hind coxa bears a finely ridged area scraped by the sharp edge of the coxal cavity, and the DYNASTINÆ, of which many genera have fine transverse ridges upon the propygidium, which by movements of the abdomen is drawn across the hinder edges of the elytra. The latter type is highly developed in the Indian *Dipelicus* (fig. 8), the propygidium

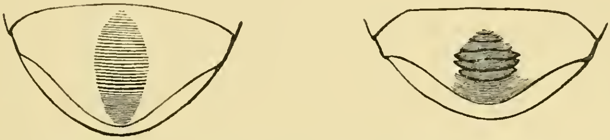

Fig. 8.—Diagrammatic representation of the terminal segments of *Dipelicus bidens* (left) and *D. cantator* (right), showing the stridulatory ridges.

of which is considerably produced at the expense of the last segment. In *Heteronychus* and related genera a pair of stridulatory files occurs in the same situation. Other situations in which the vibratory ridges occur in different Indian genera of SCARABÆIDÆ are—at the inner edge of the elytron in the two large genera *Trox* and *Copris*, the vibrations being set up in both cases by the movement of the abdomen; within the hind coxal cavity in the great beetles forming the genus *Heliocopris*, the apparatus being scraped by sharp projections upon the coxa; and upon the inside of the prosternum in *Serica*, in which the edge of the mesosternum forms the other part of the instrument. In the curious little beetles of the genus *Ochodæus* mentioned above another quite different apparatus is found. Beneath the elytra on each side of the antepenultimate segment of the abdomen is a minute process, assuming various peculiar shapes in different species, but always studded with teeth or tubercles capable of playing upon a microscopically sculptured area upon the corresponding lower surface of the elytron. In some large groups of LAMELLICORNIA peculiar types of stridulating organs have been found in representatives inhabiting other parts of the world, but none as yet in any Indian representatives. Thus in several South American genera of RUTELINÆ a striated plate occurs at the end of the hind femur (and the middle femur also in a few species), the ridges being made to

vibrate by rubbing the legs against sharp oblique ridges at the sides of the abdomen or the edges of the elytra, and in *Ischiopsopha*, a Papuan and Australian genus of Cetoniinæ, at the sides of two or three of the abdominal segments, which are scraped by ridges on the inner face of the hind femora.

The sound produced by these organs is generally a very high-pitched and by no means loud musical note, sometimes only audible by the human ear when the insect is held within a few inches. It is in no way comparable with that emitted by the vocal organs of Crickets, Grasshoppers, or Cicadas; there is no contrivance in the Coleoptera for increasing the volume of sound, nor is the faculty, except in a very few highly exceptional instances, peculiar to the males as in the former insects. The use of the faculty is very doubtful. Darwin expressed himself unable to conceive of any purpose it could serve except communication between individuals of the two sexes or emulation between those of the same sex. The facts mentioned above, and indeed most of the results of recent investigation, seem to me opposed to this explanation, especially as no organ even probably auditory in function has been found in any beetle and no completely satisfactory evidence has been obtained that an auditory sense exists. Unless this can be shown we must look for the significance of the stridulating organs in their effect upon some other animals than those possessing them. Mr. Guy Marshall has suggested (Trans. Ent. Soc. Lond. 1902, p. 403) that in many instances, and especially when the habits are nocturnal, the sounds may serve to protect the insects from enemies by indicating nauseous qualities or in some cases by suggesting the buzzing of sting-bearing species. Although it is very probable that the organs may have in many cases acquired such uses, a survey of all those groups in which stridulation is known respectively to occur and not to occur seems to me to preclude the idea that the faculty is to any large extent a concomitant of unpalatability. For reasons which I propose to discuss elsewhere it seems to me possible to account for all the known phenomena and to explain the evolution of the structures concerned upon the hypothesis that stridulation is in itself an unpleasant property and a form of protection against insectivorous animals. If this view is correct the sound is not the essential feature but only a bye-product of the vibration, which in hard-shelled insects must be communicated to a large part of the surface, and I think may not unreasonably be supposed to produce disagreeable sensations in the mouth of a captor, as is recognised to be the effect of a panoply of spines or bristles. This theory obviously involves the rejection of the term 'vocal' organs for the structures here described, at least as a general designation.

Several Lamellicorn beetles in which no stridulating surfaces seem to exist have been described as producing hissing or piping sounds. It has been suggested that this may be connected with the spiracles, as in various Diptera, but no precise observations are yet forthcoming.

Sexual Dimorphism.

A special characteristic of the Lamellicornia is the tendency of the sexes to differ markedly in their external features. There is no particular in which the differences may not manifest themselves. Colour, vestiture, size and structure are alike liable to them, and in many cases there is so little resemblance between male and female that they have been regarded as distinct species and even genera. In the PASSALIDÆ alone are marked external differences entirely absent.

In the SCARABÆIDÆ there is a tendency to the occurrence of horns upon the head and thorax in the male. Such appendages may be possessed by both sexes, but they are very rarely equally developed in both and are generally represented by mere rudiments in the female. Occasionally the armature is of nearly equal development but of different form in the two sexes, and only in two known species (*Onitis*) is it more developed in the female than in the male. Such structures are found in their fullest development in the males of the large beetles belonging to the Subfamily DYNASTINÆ. These flourish chiefly in Tropical America, but the well-known *Xylotrupes gideon*, which is abundant throughout Tropical Asia, and *Chalcosoma atlas*, shown at Plate II, fig. 12, are excellent examples. Although generally of smaller size, some of the species of the Subfamily COPRINÆ exhibit still more extraordinary forms of armature upon the head and thorax of the male.

To the same category belong the enormously enlarged mandibles sometimes characterising the males. These are almost universal in the Stag-beetles (LUCANIDÆ) and occur more rarely in various groups of SCARABÆIDÆ, *Dicaulocephalus falcifer* being a striking Indian example. The two forms of armature are never found together. Although the mandibles are normally highly-developed in the DYNASTINÆ, in the males of which horns are so common a feature, no sexual development there takes place in the mandibles except in a few hornless forms (e. g. *Ancognatha*), and such hypertrophy of the mandibles, wherever it is found, in the LUCANIDÆ, in GEOTRUPINÆ, HYBOSORINÆ, MELOLONTHINÆ, or RUTELINÆ, is never accompanied by cephalic or thoracic outgrowths.

These structures are in some cases used as weapons of offence in contests between males of the same species, and in some others of the less extravagant forms serve as tools in the task of nest-construction, as M. Fabre has described in *Copris hispanus* and *Geotrupes typhœus*. But, although they are commonly assumed to be all explainable in a similar manner, there are many reasons for believing that these uses are secondary and afford no explanation of the origin of the armament. The horns are never sharp or capable of inflicting injury upon such well-protected bodies as all these beetles possess, and they are sometimes extremely slender and brittle and directed backwards so that no practical use of any kind can be imagined for them. Thus the male of the African

Onthophagus rangifer bears upon the head a pair of long chitinous filaments streaming backwards almost horizontally and knobbed at the ends, while in the South American *Golofa porteri* the head and thorax each bear a very slender and brittle rod standing up vertically. It has been pointed out that such extravagant outgrowths are often found in fossil animals of races which have no present day representatives, a possible reason for their total disappearance being that the hypertrophy has reached a stage of such serious inconvenience as to result in the ultimate extinction of the race in competition with others not so handicapped. Perhaps they are best regarded as analogous to some characteristics of the aristocracy in certain races of mankind, such as the contracted feet and long nails of the Chinese, that is, as practical inconveniences endured with satisfaction as the proofs of an idle existence. In the female beetles, which have always the duty of providing for the succeeding generation, frequently involving very laborious and complicated operations, and in such males as co-operate, as many do, in these labours, the operation of Natural Selection ensures the development of every part of the body upon strictly utilitarian lines and the perpetuation of any impeding outgrowths is impossible; but when these functions ars confined to one sex this factor operates upon that alone, and the forces which produce variation, whatever they may be, taking the path of least resistance, seem to concentrate upon the features thus left free to them.

A frequent sexual difference in the form of the front tibiæ will illustrate this idea. In the females these are nearly always broad and strong and provided with sharp teeth at the outer edge, an effective digging implement resulting. In PASSALIDÆ, where there is an equal division of labour between the sexes, and in many other Lamellicornia, no difference is found in this respect, but in a very large number these limbs are more slender in the males, and the teeth are either absent or so spaced as to be evidently less serviceable. Every stage of disparity can be found in different species from one scarcely perceptible until a grotesque degree of elongation is reached in the male. The process has attained its limit in the strange genus *Euchirus*, of which there are two Indian species.

An interesting phenomenon in connection with these characteristics of the male sex is the relation between the degree of their development and the size of the insect, both individually and specifically. The maximum development is only found in the largest specimens of their kind and a regular diminution accompanies diminished size of the individuals, until in very dwarfed specimens these features may be absent altogether. A similar, but less exact, correspondence can be traced in the relative sizes of the species of a group. The smaller forms are almost always without well-marked secondary sexual features, which become most accentuated in the giant forms. This is well illustrated in the CETONIINÆ and DYNASTINÆ.

Differences of colour or of the sculpturing of the upper surface distinguish the sexes in various groups, and these probably result in most cases in making the females less conspicuous than the males, by a closer assimilation to their usual environment, or perhaps afford them special protection at the time of egg-laying, when they and their progeny are exposed to the greatest danger. The colour of the male is frequently brighter, as in many species of *Macronota* and *Anomala*, and in the large *Chalcosoma atlas* already mentioned, the male of which is metallic green and very smooth and brilliant, while the female is dull and slightly hairy. In many of the Valgini and Hopliini the males are decorated with bright-coloured scales, which do not appear or are much reduced in the other sex.

There are many other differences which have, or may be assumed to have, a more direct relation to the functions of the respective sexes than those which have been mentioned. The caudal style of the female *Charitovalgus* is evidently of use in oviposition, although the difference of habit which must exist between it and other closely allied genera has not yet been ascertained. The frequent difference between the sexes in the antennæ has already been referred to. In Melolonthinæ and Rutelinæ a larger club is almost universal in the male, the component joints being longer and in some of the former more numerous, the footstalk in the latter case being of course proportionately reduced. Similar differences are found in other groups, but less frequently.

I have already mentioned the enlargement of the claws of many male Rutelinæ and others. This usually occurs only in the inner claw of the fore-foot, the claw-joint being generally correspondingly enlarged and the whole tarsus thickened and shortened. In certain Dynastinæ the enlarged claw is cleft or toothed, but in the Rutelinæ the reverse condition is not uncommon, this claw being cleft in the female but entire in the male. Occasionally, as in some species of *Parastasia*, the disparity occurs in the claws of the middle foot. In some Melolonthinæ and Rutelinæ the front tarsal joints of the male bear broad hairy pads beneath.

The abdomen of the male is often arched or hollowed beneath or otherwise different from that of the female, and in certain instances where a stridulating apparatus is borne upon the dorsal part it is found to present differences in the two sexes, perhaps as a consequence of the different form of the abdomen or its greater muscularity in the male.

A multitude of other differences, affecting almost every part of the body, might be enumerated, but enough have been mentioned to show that in the Lamellicornia these sexual disparities are of more than usual importance and interest.

Food and Habits.

Most Lamellicorn beetles feed during the larval stage upon dead vegetable or animal matter, and in the adult period upon the same substances or the juices of plants. The eggs, so far as they have been observed, are spherical or shortly elliptical in shape,

with a smooth, yellowish and rather leathery exterior. In MELOLONTHINÆ and DYNASTINÆ they have been observed to increase considerably in size before hatching. They are sometimes coated with a glutinous matter so that they gather earthy particles apparently serving for concealment. The larvæ generally live underground, in rotten tree-trunks or heaps of débris, some doing considerable injury by destroying the roots of grass or cultivated crops, while certain kinds greatly offend in the perfect state by their devastations among flowers or foliage. These agricultural pests belong for the most part to the MELOLONTHINÆ, some destructive genera of which, e. g. *Lachnosterna*, *Serica* and *Apogonia*, are found in great numbers throughout the East. *Oryctes rhinoceros* does great damage to Cocoanut palms by tunnelling through the growing top, but is also found in very great numbers in tan-yards, manure-heaps, etc. The majority of species of the great groups COPRINÆ and APHODIINÆ, many of which are very familiar, feed upon the excrement of vertebrate animals, but a few are carrion-feeders. Various species of *Onthophagus* devote themselves to removing the remains of other insects, etc. Mr. H. M. Lefroy records that *O. gravis* speedily discovers and removes the dead locusts which at certain times cumber the ground in great numbers in the Plains. As all these transport the food-material below ground for the benefit of their progeny, they must be regarded as beneficial from the human standpoint.

Although frequently found in very large numbers Lamellicorn beetles are by no means prolific, many species laying only half a dozen eggs, or even less. Two or three years may be passed in development, and the life of the adult may extend to more than one season, so that the duration of life is comparatively long.

The female beetle generally tunnels below the surface of the ground to deposit her eggs, and elaborate provision is sometimes made for the offspring. Both parents may share in these labours and even in tending the young. Probably monogamy is very exceptional amongst insects, but in widely separated groups of Lamellicorns we find the male and female associated for a considerable time and accomplishing, by a regular division of labour, tasks of surprising magnitude and complexity. Most of our knowledge on this very interesting subject is due to M. Fabre, who has published (Souvenirs Entomologiques) a remarkable series of observations upon the habits of insects inhabiting the South of France, where are found representatives of many of the genera of the Indian fauna.

From exceedingly early times the peculiar ball-rolling habits of the Sacred *Scarabæus* and its allies in Southern Europe, Asia, and Africa have attracted attention. It has been supposed that the ball of dung contained at its centre the eggs of the beetle and that the rolling process in some way conduced to the well-being of the progeny; but M. Fabre has shown that the real object is the transporting to a suitable retreat of the food of the beetle itself, and that the ball which actually contains the egg is constructed underground in a burrow to which the materials have

been first carried. In this case the female seems to perform the whole of the parental duties, but in *Geotrupes*, another genus common to Europe (including Britain) and India, the two parents share equally the labour of constructing and provisioning the subterranean nest, each species excavating a burrow of different design and sometimes of great extent. In *Copris*, species of which are found in nearly every part of the world, including Britain and India, a large subterranean chamber is dug out by the two beetles and provisioned. The eggs, from 2 to 7 in number, in the European species which have been studied, are enclosed each in a separate pear-shaped cell of complex structure, and the young, although invisible, are guarded throughout their development by the mother, who repairs cracks in the cells, removes mildew and probably keeps off enemies. From the small size of the families in these insects and the usual abundance of the species, it must be inferred that the percentage of larval mortality is very low. The cells made by some of the Indian species of *Heliocopris* and *Catharsius* are very large and cased with a very thick outer layer of clay, but there is always a point at which the outer crust thins out, allowing sufficient air to penetrate to the interior for the purpose of the inmate.

Colonel Sykes described in 1835 * the discovery of five of these balls, which were at first taken to be ancient stone cannon-balls but proved on examination to contain beetle pupæ. Two of them were retained and the mature beetles emerged from them 13 and 16 months later respectively. These balls were two inches in diameter and belonged to *Heliocopris midas*, but this is not a very large species and the balls of *Heliocopris dominus* may be twice as bulky. The beetles are no doubt able to remain imprisoned for considerable periods awaiting the rains which soften the hard crust of their cells and allow them to escape. Mr. Lefroy records that one of the balls has been found eight feet below the surface of the ground.

In a European Geotrupid, *Lethrus apterus*, the male has been often observed guarding the burrow within which the female is at work, and fiercely attacking other beetles of its species which may attempt to appropriate the fruit of its labours. The burrow of this species gives access to a series of oval chambers, in each of which an egg is laid and a store of food provided, consisting of tender shoots of the vine bitten off and carried home.

The highest degree of social organisation of which we are yet aware in these insects is reached in the PASSALIDÆ, the habits of which have in recent years been investigated by Dr. Ohaus. Although the species studied are South American, those inhabiting India and most other warm regions are so very closely related that the life-histories of all are probably very similar. They feed upon rotten wood, and are found within or beneath old tree-trunks. Within each burrow Dr. Ohaus found larvæ of different ages together with the two parents. This, together with the results

* Trans. Ent. Soc. Lond. vol. i. p. 130.

of such dissections as I have made, seems to point to the likelihood of these insects being viviparous, which, if confirmed, will be yet another most abnormal characteristic of this peculiar family. The larvæ are much more active than those of other Lamellicornia, but seem to be incapable of feeding themselves and quickly die if separated from their parents. The wood is pulverised for them by the jaws of the latter and, Dr. Ohaus believes, mixed with a digestive secretion before it is supplied to them. Both larvæ and adults possess well-developed vocal organs, as already described, and Dr. Ohaus records * that upon one occasion, having broken up a stump and so dislodged a family of PASSALIDÆ, he put them all upon the ground and continued his search for other insects. When about to leave the spot his attention was attracted by a squeaking noise and, being guided by the sound to a log a short distance away, he found beneath it the two parent beetles and several of their young ones, all stridulating vigorously, while, as if directed by their cries, the remaining larvæ, also squeaking, were hastening towards them as fast as intervening obstacles would allow.

The life-history of most of the forms which feed in partly decomposed wood, like the LUCANIDÆ and many RUTELINÆ, or in vegetable débris or among the roots of plants, like most CETONIINÆ, DYNASTINÆ, and MELOLONTHINÆ, is much simpler and, although the larval development may occupy two or three years, the life of the adult is frequently very short. Thus many MELOLONTHINÆ appear at a fixed period of the year, are found in enormous numbers for a few days, and then disappear completely. The females merely deposit their eggs in loose soil a little below the surface and the larvæ feed at large until fully grown. A cocoon is then formed on the spot, the outermost layer generally consisting of fragments of earth, wood, root-fibres, or whatever material forms the food of the species, while the inner substance and agglutinative material is furnished, not by glands opening into the mouth, but by the intestine. The interior is oval in shape, and its walls generally quite smooth and polished.

Lamellicorn larvæ appear to form the only food of the young of the very large Solitary Wasps of the genus *Scolia*. The female wasp seeks her victim underground and paralyses it by means of her sting, an operation which is facilitated by the concentration of the ventral nerve ganglia in the thorax as already described. A single egg is then laid upon the immobile body and the wasp larva, upon its emergence a few days later, finds a ready and sufficient supply of food, fresh and living but incapable of resistance. The prey is speedily reduced to a hollow skin, the vital organs being avoided until the last, and the parasite then forms its cocoon upon the scene of the tragedy.†

A peculiar manner of life found in several different groups is that of the "myrmecophilous" and "termitophilous" species, that is, those which have attached themselves to Ants and Termites

* Stett. Ent. Zeit. 1900, p. 170.
† J. Fabre, Souvenirs Entomologiques, vol. iii.

respectively, living and feeding in the nests of those insects. Such a habit is generally accompanied by very marked peculiarities of structure, often so great as to completely obscure the real relationships of the species. The Cremastochilini, of which a number are described in the present volume, are good examples of these interesting insects. It seems probable that these feed upon the substance of the nest in defiance of its proper inhabitants. They generally present a curiously compact and invulnerable exterior, which evidently serves to secure them against attack. Whether their larvæ possess any corresponding adaptation is unknown. Another group appear to act as scavengers of the nests in which they live, or are otherwise serviceable to the proprietors and are not molested by them. The curious *Onthophagus myrmecophilus*, which inhabits the nests of *Pheidologiton* in tree-trunks, may be inferred, from the habits of the genus to which it belongs, to have a scavenging function there.

Most remarkable of all are those forms which have a special apparatus for the secretion of a fluid, for the sake of which they are prized and tended by their hosts. Two Indian genera at least, *Corythoderus* and *Chætopisthes*, belonging to the Subfamily Coprinæ, are of this class. In these certain deep cavities exist in the prothorax or elytra into which secretory glands open and from which spring tufts of bright yellow hairs. The fluid probably flows over these hairs and is licked off by the Termites with which the various species of these two genera live; or possibly the hairs are connected with a nervous apparatus and their stimulation by the Termites promotes the secretion. The organs of the mouth are degenerate in the beetles, an indication that they are fed by their hosts; and from exactly similar phenomena in quite other groups of beetles, it can safely be assumed that the secretion is regarded as a luxury by the hosts and for its sake the beetles and their young are cherished and all their wants supplied.

Classification.

It will be found that in the course of this work methods of classification more or less at variance with those at present adopted have been introduced, and names of genera and species now in frequent use are rejected with a freedom that may not find general approval. The classification here adopted does not pretend to finality in its details, but only to convenience, for the time when knowledge of the constituent forms of any group of Lamellicornia will even approach completeness is yet far off, and, as new forms reveal themselves, apparent breaks of continuity must disappear and revision of the limits of the groups which systematisation renders necessary be continually repeated. Genera and larger divisions are therefore arbitrary and their most convenient limits must remain a matter of opinion. The system which has been adopted of expressing in tabular form the most salient differential characters of every species, genus and larger division has provided a crucial test of existing groupings and entailed a consistency which is not to be expected from the short memoirs by

many authors (few of them laying claim to any comprehensiveness or continuity), which form a large part of the literature of this subject.

For the purpose of accurate identification it is obviously desirable that every group should be distinguished by features of both sexes, but unfortunately in the Lamellicornia, in which, more than in any other beetles, the most salient features are seen in the male alone, this principle has been very frequently infringed. Species and genera have been constantly based upon examples of one sex only and often without ascertaining or recording the sex. Sexual characters may be the chief criteria in the discrimination of species, and it may even be necessary to separate forms of which one sex appears to us to be without differential characters, but I consider such features, unconfirmed by any other, quite inadequate for forming genera or superior divisions. They may be valuable as supplementing more fundamental, but less obvious differences, but as a rule they are very inconstant, and species whose relationship is undeniably very close often display wide differences in this respect. Genera which have been sunk on this ground will often be found to contain very few, or only one, species.

Wherever any marked external difference between the two sexes is found it has been pointed out, and care has been taken to exclude from the general descriptions all features distinctive of one sex. As it sometimes happens that a species is known only from a single specimen, or examples of one sex, it is not always possible to distinguish such features.

In order to ensure accurate nomenclature, no effort has been spared to obtain actual types or co-types for examination whenever possible. Unfortunately some have not been traced, but mention of the present location of the type has been made when it has been ascertained, and those studied in the course of this work are indicated with an asterisk.

It should perhaps be mentioned that all descriptions are drawn from Museum specimens and, as regards colours at least, will perhaps be found not always to apply accurately to living specimens, owing to inevitable changes which take place after death. Such knowledge as the author has of the insects in their natural state is derived from European forms alone, a disadvantage which is to be regretted, although it must be remembered that in so vast a region as India only a fraction of the species of any large group are likely to come under the observation of any single individual even with the maximum of opportunity, whilst it is in Europe alone that that fauna can be studied with even approximate completeness and in relation to the faunas of adjacent regions and of the world in general.

The Lamellicornia are divided into three Families which may be briefly distinguished as follows:—

Antennæ not elbowed nor capable of being rolled up, the joints of the club very thin and closely co-adapted .... **SCARABÆIDÆ.**

Antennæ not elbowed, the joints of the club not very thin, brought together by rolling up	**PASSALIDÆ.**
Antennæ elbowed, not capable of rolling up, the joints of the club not very thin nor closely co-adapted	**LUCANIDÆ.**

Prof. Kolbe regards the last group as a Subfamily of the first and adds another family, SYNTELIIDÆ, consisting of the isolated genus *Syntelia*, but the grounds of this are debatable and I prefer to retain the older classification.

In the SCARABÆIDÆ, which comprise an enormous majority of the Lamellicornia, the number of joints in the club of the antenna is invariably three, except in some of the Melolonthinæ and two extremely primitive genera *Pachypus* and *Pleocoma*, the first inhabiting Europe and the second North America. The family is generally divided into two great groups, according to the position of the abdominal spiracles, but certain primitive forms are really intermediate between the two, and a South American genus, *Aclopus*, is stated to be Pleurostict in the female and Laparostict in the male, that is, the abdominal spiracles are placed in the chitinous rings in the first and in the connecting membrane in the second. No intermediate forms are found in the Indian fauna, which comprises the following Subfamilies:—

Posterior spiracles situated in the dorsal part of the chitinous ventral segments	PLEUROSTICTI.
Labrum membranous, not exserted.	
Mandibles not visible externally; front coxæ vertical	**Cetoniinæ**, p. 32.
Mandibles partly visible externally; front coxæ transverse	**Dynastinæ**, [p. 256.
Labrum chitinous and visible externally.	
Posterior spiracles placed in strongly diverging lines: claws movable, unequal	**Rutelinæ.**
Posterior spiracles placed in scarcely diverging lines: claws generally fixed and equal	**Melolonthinæ.**
Posterior spiracles situated in the membrane between dorsal and ventral segments	LAPAROSTICTI.
Labrum and mandibles very prominent, horizontal.	
Eyes entire	**Ochodæinæ.**
Eyes divided in front.	
Antennæ 11-jointed	**Geotrupinæ.**
Antennæ 10-jointed.	
Antennal club simple	**Orphninæ.**
Antennal club telescopic	**Hybosorinæ.**
Antennæ 9-jointed	**Chironinæ.**
Labrum and mandibles large but not horizontal.	**Troginæ.**
Labrum and mandibles reduced and concealed.	
Hind tibia with two spurs, middle coxæ not widely separated	**Aphodiinæ.**
Hind tibia with one spur, middle coxæ widely separated	**Coprinæ.**

Family SCARABÆIDÆ.

Subfamily CETONIINÆ.

These are among the most familiar of beetles in the warmer regions of the earth, being typically diurnal, brightly coloured and of moderately large size. Some of the most brilliant and striking of all animal forms are found in the Subfamily and, as the species are often very abundant and make little or no attempt at concealment, they attract more attention than most other insects, both in the living state and in collections. They may perhaps be regarded as a group of comparatively late evolution and still enjoying the maximum of vigour and prosperity. In consequence they form a very homogeneous assemblage without considerable gaps and without any important structural variation. As a result, classification is very difficult, the component sections merging almost imperceptibly into one another. An effect of the attractiveness of the group is that it has received a special amount of attention from a very large number of systematists of every kind, but, although the literature relating to it is exceptionally large, it has received very little serious scientific study. Of the metamorphoses and habits of the species we know lamentably little, and for any comprehensive classification it is necessary to go back to a period when the number of known forms had reached only a fraction of its present size. The Monograph of the group by Gory and Percheron published in 1833, although illustrated with copious coloured figures, is a most unsatisfactory work which probably introduced more confusion than it cleared up. The admirable volume devoted to the subject by Burmeister (Handbuch der Entomologie, vol. iii, 1842) is unfortunately without illustrations, and a further misfortune for the Indian fauna was occasioned by the practically simultaneous publication with it of Westwood's work on "The Goliathideous Cetoniidæ of Asia" (Arcana Entomologica, vol. i.) and of Blanchard's "List of Cetoniidæ" in the Paris Museum. In these works different names were in various cases given independently to the same form. Thus Westwood's genus *Heterorrhina* is Burmeister's *Coryphocera* and *Heterorrhina dives* of Westwood was actually described by Burmeister from the same unique specimen as *Mystroceros diardi*. In such cases I have allowed the priority to Westwood, whose work was published in two parts, the second appearing on the 1st September 1842, while Burmeister's Preface being dated September 1842, may safely be assumed to have been unpublished on the first of that month.

The number of Cetoniinæ now recorded for the whole world is about 2500, and of these nearly 250 are here enumerated as Indian.

Structure.

The exterior is very hard and chitinous, frequently covered with a peculiar bloom, like that of a ripe plum, and decorated with spots or patches of white or yellow consisting of a powdery substance which appears to be of a similar nature to hairs or scales and usually occupies slight depressions in the integument. In rare cases this substance has a silvery, golden or opalescent lustre, but it is generally quite dull. In the small species forming the section Valgini this type of decoration is not found, but the body is more or less covered with scales of different colours, by which patterns are produced.

As in the Dynastinæ, Rutelinæ and Melolonthinæ, the abdomen is composed of six segments ventrally, the last dorsal one is large and exposed, and the posterior spiracles are situated in the chitinous dorsal part of the ventral segments and not in the flexible membrane connecting the ventral and dorsal parts of the abdomen. A peculiarity in the structure of the spiracles is found in the Valgini and a few members of other sections, the last pair of spiracles, and sometimes in a less degree the one or two pairs immediately preceding, being placed at the end of prominent horny tubercles.

The front of the head, or clypeus, is always well developed, forming as a rule a broad shovel-like instrument and apt, occasionally in both sexes, but more often in the male alone, to give rise to horns of various forms and sometimes considerable size. In a few cases the prothorax of the male bears a similar armature.

The prothorax is typically fitted very closely to the hinder part of the body, generally having either an excision in front of the scutellum or a prolongation by which the latter is partly or entirely concealed. All the species are active fliers and, except in the small section of the Trichiini, flight is accomplished in a very characteristic manner, with which is connected the most distinctive features of their external anatomy. The elytra are not lifted high and carried back to back in flight, according to the common manner of beetles, but are only slightly raised and the wings are slipped out beneath their lateral edges. The elytra accordingly only wrap over the body near the shoulders and are more or less reduced at the sides, sometimes becoming quite narrow and distinctly exposing the lateral parts of the back. Together with this comparative immobility of the elytron, has been produced a general consolidation of the body and close co-adaptation of its parts. The epimera of the mesosternum are so developed as to fill the angles between the prothorax and the shoulders of the elytra and the prothorax slides over the elytron and the mesothorax, so that even when drawn forward it has not free play in all directions but remains closely applied to the hind body. There is thus no arresting ridge at the front of the elytra and scutellum as in the

most nearly related groups, and the apparent size of the scutellum changes with the position of the prothorax. This feature, however, is absent in the Trichiini and Valgini and in a few of the remarkable horned Cetoniini. Another peculiarity of the Subfamily is the pigmentation of the wings, the terminal part and often the whole being coloured a deep red-brown or blue-black. This is very unusual in beetles, although often found in insects in which the wings are always exposed.

The front coxæ do not spread out in a transverse direction, as in the Dynastinæ, &c., but are inserted vertically, very prominent and in close contact, and the prosternum is not elevated behind them. The middle coxæ are transverse and level with the metasternum, the front of which projects between them and often in front of them, sometimes forming a long pointed or truncated process. The end of the process consists of an elevated part of the mesosternum united to the metasternum, but the line of junction is not always traceable. The hind coxæ are large, meeting, except in the small species forming the Valgini, and generally prominent at the sides of the body and visible from above. The femora are simple and differ little, although those of the hind legs are thickened or arched in the males of a few forms. The front tibiæ are generally toothed externally, at least in the female, and the teeth are never more than three in number except in the Valgini, most of which have five. The posterior tibiæ have often an internal fringe of hairs and an external spine near the middle. The tarsi consist of five simple joints, except in certain Cremastochilini, which, living in the nests of Ants or Termites, have become entirely abnormal in many points of their structure, like many other insects leading the same peculiar life. The claws are always simple and immovable, with rare exceptions in the front claws of the males of certain African forms.

The mouth is adapted for dealing only with soft or liquid food, except in the Cremastochilini, which have the mandibles strong and sharp although small. The labrum is reduced to little more than a vestige, forming two membranous lobes entirely concealed in the roof of the mouth. The mandibles, except those of the Cremastochilini, are thin and incapable of biting, consisting of a blunt flexible rod with a membranous internal fringe at the base. The maxillæ are well-developed, strong and generally toothed. In typical Cetoniinæ they are covered with long hairs, which form terminal tufts, often visible externally and apparently the chief means of collecting the sweet juices upon which the insects feed. The mentum is very chitinous, without a distinct ligula, and generally bears long stiff hairs. Both maxillary and labial palpi are 3-jointed and slender. In the Cremastochilini the mentum is dilated and forms a kind of operculum, coinciding with the clypeus and shutting in completely all the other organs of the mouth.

The eyes are large, prominent and very finely facetted, and the antennæ consist of ten joints, the last three forming the club, and varying very little. The basal joint is larger than the rest, and in

some CREMASTOCHILINI and VALGINI is very broad and serves to enclose and protect the sensitive part of the organ when the head is folded beneath the thorax.

Sexual Dimorphism.

In several genera the male bears a pair of horns or antlers upon the head, and there are a few (although at present no Indian representative is known) in which a single horn is borne upon the prothorax. In *Trigonophorus* both sexes bear a process at the front of the clypeus and another process upon the forehead the latter differing in male and female; while in *Heterorrhina* an appendage is always found upon the forehead in the female, but not always in the male. Much more frequent sexual differences are found in the structure of the legs. I have already remarked that these are almost always used in the female for digging. The front tibia is of chief importance for this purpose, and is accordingly strong and armed externally with teeth, generally three in number. In many males this function does not exist, and the tibia is less stout and strong and the teeth reduced or quite absent. In some, such as *Jumnos ruckeri* (Pl. I, fig. 6), the whole leg is greatly elongated and the tibia is fantastically toothed on the lower surface. The tarsi are very often more slender in the male than in the other sex. On the other hand the hind legs are sometimes stronger in the male than in the female, as in *Euchloropus lætus*. A slight but peculiar feature is often found in the two spines at the end of the hind tibia, which are commonly short and sharp in the male, and longer and blunter in the female. Elongation of the club of the antenna, very general in the males of other subfamilies, is rare in the CETONIINÆ. The form of the abdomen very frequently differs, the males having the lower surface arched or even deeply hollowed out along the middle. In females of *Valgus* and *Charitovalgus* the end of the abdomen gives rise to a long slender style suggestive of the ovipositor of Hymenoptera and other insects.

Differences of colour and pattern also occur, although they are less common than structural differences. Generally their nature has been overlooked and the two sexes have been described as distinct species, as in various members of the genera *Macronota* and *Glycyphana*. In such cases the male is usually brightly coloured and the female dull and undistinguished. Thus in *Macronota crucicollis* and *oberthuri*, two South Indian species, the males are red or black, decorated with an elaborate pattern of white lines, while the females are coloured a uniform clayey-brown. In the North-Indian *Heterorrhina mutabilis* and *H. dispar*, the males are resplendent in exquisite shades of green, blue or purple, and the females an unpleasing dull brown or black. In some of the VALGINI, in which the markings are due to the arrangement of different coloured scales, the colours are also different in the two sexes, and here again the males have brighter and more varied colours.

Colour and Pattern.

Few, if any, groups of beetles offer richer materials for a study of the problems of colour and pattern than the CETONIINÆ. Black or dull-coloured species are exceptional and found only in the CREMASTOCHILINI and a few genera peculiar in their very retiring or nocturnal habits. Some, however, are of a highly polished and lustrous black, relieved with patches of bright orange, red or green, as in the genus *Diceros*, a sharp contrast which must make them very conspicuous in almost any environment. In the highly characteristic Indian group of the HETERORRHINIDES vivid greens predominate and the surface is always very shining, frequently glassy. This colouring is very variable, and different individuals of a species may be grass green, olive green, indigo, purple, blue, black, fiery red, or golden green. Such shades may always be regarded as interchangeable and of no significance for the purpose of classification. All the species, however, are not equally variable, for while some shade of green is nearly always the normal one, in some species other colours are almost of equal frequency, as for instance in *Torynorrhina distincta* and *Heterorrhina nigritarsis*, and in others they are of rare occurrence, as in *Heterorrhina punctatissima* and most species of *Trigonophorus*. Defect of pigment in all these green species seems to result in the production of fiery reds, and it is probable that the red condition is passed through in the process of attaining the full colouring of maturity. Experiment shows that it is produced in dead specimens by the chemical decomposition which takes place in the green pigment upon prolonged exposure to sunlight.

In the HETERORRHINIDES colour patterns do not occur, or only in a few cases in the shape of large masses of yellow or black. In the most typical CETONIINÆ, represented by the genera *Cetonia*, *Protatia*, *Clinteria*, etc., patterns are the rule and are due to a very fine powdery substance generally lying in and filling depressions in the surface and therefore less easily worn off than is often the case with similar powdery or scaly adornments. These decorations are always white or some shade of yellow, occasionally approaching red, and can almost always be traced to a primitive arrangement of spots which recurs over and over again throughout the group. The primary spots are a pair placed transversely behind the middle of the pronotum and four behind the middle of the elytra in a transverse, but not a straight line. Secondary, and generally smaller, spots constantly found are a pair before the middle of the pronotum, a pair at the hind margin of each elytron, two or three at the outer margin, and one or more near the scutellum on each side. The spots have a marked tendency to lengthen and coalesce, those of the thorax longitudinally and those of the elytra transversely, forming irregular bands, of which one crossing the elytra beyond the middle is always a prominent feature. The further development of the bands produces a complex irregular network, and finally, as in *Protatia fusca*, a fine cobweb of interlacing pale

lines. The marking is almost always accompanied on the lower surface by more massive light patches upon the side pieces of the thorax and the sides of the first four abdominal segments.

The two types of pattern sometimes occur together, the superficial powdery markings overlying an arrangement of two colours in the inner layers of the integument and so producing a triple colour-scheme. This is frequent in the genus *Macronota*, in which the evolution of pattern reaches its furthest limit in Lamellicorn beetles. In several species of the genus complex patterns of black and red underlie still more complex traceries of white or yellow. In *Macronota ursus* and *M. westwoodi* the pattern is produced by a long dense covering of black and orange hairs, which, together with the shape of the body, bring about an extraordinarily close resemblance to two species of Humble Bees inhabiting the same district as the beetles. Few more striking, or more obviously useful, instances of mimicry than these could be found. In some of the other species of the genus, entirely different in appearance but closely similar in structure, a peculiar iridescent sheen upon the long narrow elytra, the partly uncovered yellow- or white-banded abdomen, and the general form of the body suggest a mimetic resemblance to wasps or bees which observation of the insects in nature may or may not confirm. Various species of CETONIINÆ are known to be unpalatable to birds and other insectivorous animals, and it can hardly be doubted that the boldly contrasted colours of many species, such as *Clinteria imperialis* and *Glycosia tricolor*, are warning colours for advertising this inedible quality.

In the VALGINI another type of decoration appears, the whole or greater part of the body being covered with scales or setæ of large size relatively to that of the body and of more or less diversified colours, ranging from white, through all shades of yellow and brown, to black. These scales or setæ are very liable to abrasion, leaving the underlying uniformly black or brown surface exposed.

Habits and Metamorphoses.

With the remarkable exception of a Tropical American genus, *Inca*, the larvæ of which were recently found by Dr. Ohaus to have the power of climbing trees, the larvæ of CETONIINÆ do not differ in any important particular from those of DYNASTINÆ or RUTELINÆ, so far as they are at present known. Like those of nearly all Lamellicornia, they are inactive and live concealed, generally underground, where they feed upon roots, decaying wood or vegetable débris. The habits of the more peculiar genera of the Indian fauna are still unknown, and the only information which I have been able to obtain on this subject concerns those genera which, besides India, inhabit Europe or other parts of the world. M. Fabre* has described the life-histories of *Cetonia*, *Protætia* and

* Souvenirs Entomologiques, vol. viii.

Oxythyrea, three genera common to India and Europe, whose manner of life seems almost the same. All of these feed within accumulations of decaying leaves and vegetable refuse, the female burrowing into the mass and depositing her eggs there. It is a remarkable fact, observed by M. Fabre, that this does not take place, at least in Europe, until long after maturity has been reached. The first summer and autumn of adult life are entirely devoted to the consumption of nectar, exuding sap or the juices of ripe fruit, and no eggs are laid until the following year.

Protœtia cuprea, F., an abundant species which ranges from Southern Europe to Northern India, prefers to deposit its eggs in ants' nests, and apparently only selects other situations when suitable nests are not to be found. The larvæ are often found in numbers feeding upon the woody material composing the nests of *Formica rufa* and *F. pratensis*, and seemingly not interfered with by the owners of the nest.

Although provided with well-developed legs the larva moves solely by contractions of the body and generally upon its back. The legs seem to serve chiefly for the construction of the cocoon, which, after two or three years of larval life, is formed *in situ* from fragments of the food-material cemented together into a cell about the size of a pigeon's egg and plastered and smoothed inside with matter furnished by the intestine. One to three months are passed in the pupal stage and then the perfect insect breaks open the cocoon and makes its way above ground, soon beginning to feed voraciously.

In *Protætia cuprea* and other species known to breed in ants' nests there is no special adaptation of structure to this habit, but in others, in which perhaps this mode of life is of more ancient date and more firmly established, the female shows certain adaptations, apparently enabling her better to resist the ants while depositing her eggs in the nest; while the whole of the CREMASTOCHILINI have acquired in both sexes peculiar characteristics which must indicate the adoption of the habit at a very remote period. In this group the greater part of the life both before and after maturity seems to be spent in the dark recesses of ants' or termites' nests, and adults as well as larvæ seem to feed upon the nest-substance. The bright colouring of the generally light-loving CETONIINÆ has given place to uniform black or brown, the body has acquired an extremely hard and compact exterior, and the mouth is adapted for dealing with solid food instead of liquids. The mandibles are strong and sharp and the mentum completely shuts in all the mouth appendages, so that the whole body presents no vulnerable part. In many the basal joint of the antenna forms a stopper by which the succeeding joints can be shut up between the head and the front legs, and in the genus *Callinomes* the tarsi are reduced to only three visible joints, which are so closely fitted together as to be capable of very little movement.

In one genus of CREMASTOCHILINI (*Macroma*) bright colours prevail and the form is less aberrant than in the rest, and, as would be expected, the species are diurnal and frequent flowers,

although also found in ants' nests. Either there has been a reversion to ancestral habits or they have never been entirely lost. One other genus (*Spilophorus*) is exceptional in having conspicuous white markings (conspicuous when closely examined, that is, but probably the reverse in its usual environment) upon a shining black background, and there is reason for supposing that this also is less completely subterranean in habit than other CREMASTOCHILINI. *Spilophorus cretosus* has been found in the nest of an ant, but congeners inhabiting Africa and having a similar coloration are found in birds' nests, upon which their larvæ feed, as Mr. Guy Marshall has observed. The coloration suggests a cryptic adaptation to such an environment and it will probably be found that the two Indian species have, at least partially, the same habit.

Several species of CETONIINÆ in the adult condition attack the nests or hives of bees, opening the cells and devouring the stored honey. *Protœtia opaca* around the Mediterranean, *P. fusca* (an Indian species) in Australia, and probably other species, cause considerable injury in this way. Others are injurious on account of their habit of destroying the stamens of flowers and so preventing the formation of fruit. Whether any of them are capable of injuring ripe fruits when in perfectly sound condition, or whether they only take advantage of abrasions already existing, is uncertain.

The CETONIINÆ consist of three well-defined Divisions, themselves sometimes regarded as forming Subfamilies. They are all represented within our region and may be tabulated as follows:—

Mesosternal epimera dilated above and usually reaching the dorsal surface: base of the pronotum not meeting ridges upon scutellum and elytra (except in *Dicranocephalus*)	Div. I. **Cetoniini**, [p. 32.
Mesosternal epimera not dilated nor reaching the dorsal surface: base of the pronotum meeting ridges upon scutellum and elytra.	[p. 222.
Hind coxæ widely separated	Div. II. **Valgini**,
Hind coxæ contiguous	Div. III. **Trichiini**, [p. 249.

The first Division consists of two Sections distinguished as follows:—

Mandibles thin and not sharp-pointed nor adapted for biting, furnished with a free membranous inner lobe	CETONIINA, p. 32.
Mandibles strong and sharp, without a free membranous inner lobe	CREMASTOCHILINA, [p. 198.

Division I. CETONIINI.

Section 1. CETONIINA.

This section comprises the great majority of the known species of CETONIINÆ, including all the largest and most handsome forms and those in which are found united all the characteristic features of the Subfamily, viz. the feebly chitinised mandibles, brush-like maxillæ, ascending mesosternal epimera, and pronotum (except in *Dicranocephalus*) sliding closely over the base of the hind body without meeting any arresting ridge upon the scutellum or elytra. In each of the three remaining Sections one or more of these features is absent.

The CETONIINA are exceedingly homogeneous in all essential points of structure, forming a series so nearly unbroken that a satisfactory subdivision has never been attained. The frequently great differences between the two sexes and the absence of marked structural features in the females make it almost impossible to define minor groups so as to include both sexes. I have divided the genera belonging to the Indian fauna into the following groups, but it should be understood that the characters used in the tables which follow are not to be regarded as fundamental or applicable to forms from other regions. They are selected only as those most easily available for the discrimination of the insects dealt with in the present work.

Key to the Groups of CETONIINA.

1	(2)	Hind coxæ and abdomen completely covered by the elytra..........................	*Goliathides*, p. 33.
2	(1)	Hind coxæ and abdomen partially visible from above.	
3	(8)	Sides of the scutellum straight, convex or sinuous.	
4	(5)	Base of the pronotum lobed in the middle..	*Macronotides*, [p. 35.
5	(4)	Base of the pronotum not lobed in the middle	
6	(7)	Base of the pronotum in a transverse line ..	*Heterorrhinides*, [p. 67.
7	(6)	Base of the pronotum not in a transverse line	*Cetoniides*, p. 108.
8	(3)	Sides of the scutellum concave, apex extremely sharp.	
9	(10)	Clypeus not forming two sharp angles in front	*Oxythyreides*, [p. 173.
10	(9)	Clypeus forming two sharp angles in front ..	*Lomapterides*, [p. 191.

Group 1. *GOLIATHIDES.*

This group contains the well known African giants of the genus *Goliathus* and the peculiar Oriental genus *Dicranocephalus*, consisting of four or five species, of which only one is Indian.

Genus **DICRANOCEPHALUS.**

Dicranocephalus, *Westw., Arcana Ent.* i, 1841, p. 5.
Dicranocephalus, *Hope, Gray's Zool. Misc.* 1831, p. 24 (undescribed).

TYPE, *D. wallichi*, Hope.
Range. N. India, Indo-China and China.

Form rather short and broad, with a subglobose prothorax, widest at the middle and contracted in front and behind, the hind angles rounded and the base gently convex. Mesosternal epimera distinctly visible from above but not reaching the dorsal surface. Scutellum forming an equilateral triangle, with the sides straight and the apex rather sharp. Elytra entirely covering the abdomen, with their sides straight and the apical angles blunt. Middle coxæ separated by a narrow process, which is not produced forwards but projects vertically downwards and is short and acutely pointed. Labrum small, narrow and feebly bilobed. Mandibles very slight, with the chitinous outer portion thin, scarcely projecting beyond the broad membranous inner lobe. Maxillæ very long and slender, without inner lobe, acute and bearing a very long hairy fringe at the end. Mentum broad and bilobed.

♂. Sides of the clypeus produced into a pair of long branched antlers projecting forward and curving backward at the tips. The antennæ (especially the basal joint) longer than in the ♀, and the front tibiæ and all the tarsi very long, the former slender, slightly incurved at the extremity and armed externally with three feeble

teeth situated far apart. Front coxæ separated by a wide flat interval.

♀. Clypeus broad, slightly hollowed above, with the front angles sharp. Front tibiæ broad, strongly tridentate. Tarsi about half as long as in the ♂.

1. Dicranocephalus wallichi.

Dicranocephalus wallichi, *Hope,* Gray's Zool. Misc.* 1831, p. 24; *Westw., Arcana Ent.* i, 1841, p. 5, pl. 1. fig. 4.
Goliathus wellech, *G. & P., Monogr. Cet.* 1833, p. 154.

Black or piceous, with the horns, legs and abdomen of the male reddish and clothed upon the sides of the head, the pronotum, elytra and sides of the sternum, and also, in the male, upon the scutellum and pygidium, with an ochreous velvety bloom, leaving bare two slightly curved longitudinal carinæ upon the prothorax and an incomplete lateral carina upon each elytron.

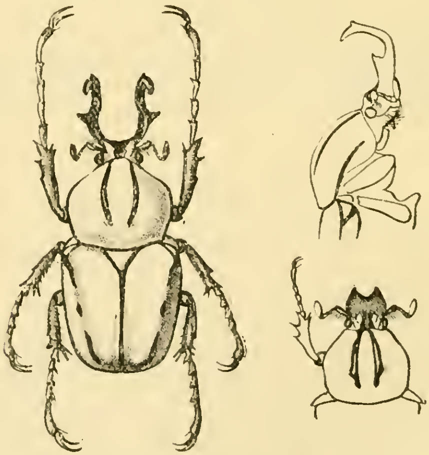

Fig. 9.—*Dicranocephalus wallichi*, male (natural size), with lateral view (above) and anterior part of female (below).

The *head* of the ♂ is coriaceous and hollowed above, with the *clypeus* minutely notched in the middle, and the sides are produced forwards into a pair of long and flattened slender horns, curving upwards and having a broad external branch behind the middle and a tooth near the apex. The *prothorax* is very convex and strongly narrowed in front and there is a very slight lobe at the middle of the posterior margin. All the tarsi and the claws are very greatly developed.

* An asterisk (*) indicates that a type or cotype has been examined in connection with the present work.

In the ♀ the *head* is coarsely punctured above, and the *clypeus* is only sharply angular on each side. The *prothorax* is shorter and less convex, the *scutellum* and *pygidium* are naked, and the yellow clothing of the remaining surface is liable to disappear partially or entirely. The *legs* are black and quite short.

Length † 20-28 mm.; *breadth* 11-16 mm.

NEPAL; SIKKIM: Darjiling; ASSAM: Khasi Hills, Shillong.

Type in the British Museum.

Colonel Bingham, who observed this very striking insect in various parts of Sikkim, told me that it is very sluggish and is generally found clinging to the trunks of trees, in which situation it is very inconspicuous. After heavy rains they become active and may be caught in large numbers. The males do not appear to fight nor to make any use of their large antlers, which seem, on the contrary, to be rather inconvenient to them.

Group 2. *MACRONOTIDES.*

This Group consists of insects rather gracefully, not compactly, built, and generally much flattened above or even depressed along the middle line of the back. The pronotum is always more or less produced over the scutellum but leaves a considerable part of it exposed; and the scutellum itself is moderately long and sharp, but not extremely acute as in the OXYTHYREIDES and LOMAPTERIDES.

The sexes are sometimes quite similar but often differ very strikingly and the differences may appear in almost any part of the external anatomy.

Table of the Genera.

1 (6) Body more or less clothed with hair, setæ or opaque bloom: mesonotum not produced into a long process.
2 (3) Clypeus of the male produced into a horn or horns: that of the female bidentate .... MYCTERISTES, Cast., p. 36.
  a. Clypeus of the male bearing two horns .... subg. PRIGENIA, Mohn.
  b. Clypeus of the male bearing a single horn .... subg. CEPHALOCOSMUS, Kr.
3 (2) Clypeus similar in the two sexes, rounded or gently bilobed.
4 (5) Elytra not excised at the outer margins .... GNORIMIDIA, Lansb., p. 40.
5 (4) Elytra excised at the outer margins MACRONOTA, Hoff., p. 41.
6 (1) Body entirely smooth and shining: mesosternum produced into a long process .... CLEROTA, Burm., p. 66.

† All length measurements are taken from the front of the clypeus, exclusive of horns or processes; the breadth is always the maximum breadth unless otherwise stated.

Genus MYCTERISTES.

Mycteristes, *Cast., Hist. Nat.* ii, 1840, p. 162.
Prigenia, *Mohnike, Arch. f. Natur.* xxvii, 1871, p. 228.
Cephalocosmus, *Kraatz, Deutsche Ent. Zeitschr.* 1895, p. 106.

Type, *Goliathus rhinophyllus*, Wied. (Java).

Range. N. India, Burma, Malayan Region.

Form slender, with rather long legs and the front tibiæ sharply three-toothed in both sexes. Prothorax much narrower at the shoulders than the elytra, wider in the middle than at the base, and having a very short basal lobe. Scutellar region slightly depressed. Scutellum rather sharp at the apex, with the sides bisinuate. Elytra scarcely sinuated behind the shoulders. Mesosternum very slightly prominent between the coxæ. Labrum minute, moderately chitinised, bilobed. Mandibles minute, with the chitinous lateral lobe feeble, blunt, and not reaching much beyond the broad basal membrane. Maxillæ strong, armed with three very sharp and slender teeth set at right angles, and terminating in a long and thick tuft of hairs; palpi rather slender, with the terminal joint as long as the others together. Mentum elongate, bilobed but not dilated in front; palpi moderately slender.

The ♂ has the head excavated above and the clypeal margin produced into two lateral, or a single median, horn. The front tibiæ and all the tarsi are longer than in the ♀ and the abdomen is longitudinally channelled beneath.

The ♀ has the head flat and the clypeus bidentate, and the legs are of normal length.

In some of the species, although not in those represented in our area, the male bears a horn upon the thorax.

Key to the Species.

1 (2) Head of ♂ armed with two straight horns........................ *khasiana*, Jord., p. 36.
2 (1) Head of ♂ armed with one dilated horn.
3 (6) Front angles of the clypeus produced in ♂. [p. 37.
4 (5) Pronotum evenly and finely strigose *microphyllus*, Wood-Mason,
5 (4) Pronotum rugosely punctured .... *gestroi*, sp. n., p. 38.
6 (3) Front angles of the clypeus not produced in ♂ .... *auritus*, sp. n., p. 39.

2. Mycteristes khasiana.

Prigenia khasiana, *Jordan*,* *Nov. Zool.* i, 1894, p. 691.

Obscurely coppery, opaque above and shining beneath; thinly clothed with decumbent grey setæ above and more closely with short whitish hairs beneath.

Elongate in form and flattened above, with the head and prothorax rugosely punctured. The *prothorax* is much narrower than the elytra at the shoulders, broadest in the middle, heptagonal, with the sides strongly angulated and the base broadly lobed. The *scutellum* is rather broad and striolated at the base and apex. The *elytra* are finely rugose, scarcely at all excised behind the shoulders and completely covering the abdomen; they are narrowed behind, and each has a costa along the middle, angulated and dilated behind the scutellum. The *pygidium* is finely transversely striolated, and the lower surface of the body rugose. The *middle tibiæ* have a strong spine beyond the middle of the outer edge, and the *hind tibiæ* are slender, without a corresponding spine.

♂. The clypeus is deeply hollowed and produced in front into two short parallel horns, bent upwards at the tips and slightly toothed externally. The vertex is produced horizontally into two tubercles, between which there is a deep emargination. The antennal club, the front tibiæ and all the tarsi are longer than in the ♀ and the abdomen is channelled down the middle.

♀. The head is flat, with the front margin bidentate. The prothorax is more rugose than in the ♂ and considerably more dilated in the middle.

Length 16·5–19 mm.; *breadth* 8–9 mm.

ASSAM: Khasi Hills.

Type in Capt. Moser's collection: cotypes in Mr. O. E. Janson's collection.

3. **Mycteristes microphyllus.**

Mycteristes microphyllus, *Wood-Mason,* Ann. Nat. Hist.* (5) vii, 1881, p. 411, pl. xvii, figs. A–C.

Cephalocosmus moewisii, *Kraatz, Deutsche Ent. Zeitschr.* 1895, p. 106; *Janson, Trans. Ent. Soc. Lond.* 1903, p. 307.

Deep bronze-red, not shining, thinly clothed above and below with decumbent yellowish setæ.

The body is elongate and rather depressed. The *head* is rugosely punctured, and the *pronotum* finely and densely strigose, slightly impressed in the middle in front and behind, with the sides roundly angulated before the middle and convergent behind, the posterior angles obtuse and the base feebly lobed. The *scutellum* is rather long and striolated at the base and apex. The *elytra* cover the abdomen and are very finely rugose, with a costa down the middle of each, bent and dilated behind the scutellum. The *pygidium* is finely transversely striolated, and the lower surface of the body rugose at the sides and punctured in the middle. The four *posterior tibiæ* have each a strong spine beyond the middle of the outer edge.

♂. The head is excavated above and bears a short horizontal posterior process, slightly bifid in front, the angles of the clypeus are acuminate and the front margin is also produced in the middle

into a small horn which is curved upwards and expanded and truncate at the extremity. The antennal club is rather long, the front tibiæ and all the tarsi are elongate and the abdomen is channelled beneath.

♀. The clypeus is simple but the anterior angles form short sharp processes. The legs are of normal length. This sex is extremely like the female of the preceding species, but may be distinguished by the sharp spine beyond the middle of the hind tibia, which is absent in that form.

Length 18 mm.; *breadth* 8 mm.

Assam: Naga Hills; Sikkim: Darjiling; Bhutan: Maria Basti.

Type in the Indian Museum; that of *moewisii* in the German Entomological National Museum.

4. Mycteristes (Cephalocosmus) gestroi, sp. n.

Mycteristes microphyllus, *Gestro* * (nec *Wood-Mason*), *Ann. Mus. Genova* (2) x, 1891, p. 837.

Bronze-red or green, feebly shining and thinly clothed above and beneath with minute whitish setæ. It is depressed and moderately elongate, with the *head* and *pronotum* rugosely punctured and the latter slightly impressed in front and behind, with the sides slightly convergent behind, the posterior angles obtuse and the base feebly lobed. The *scutellum* is long and pointed,

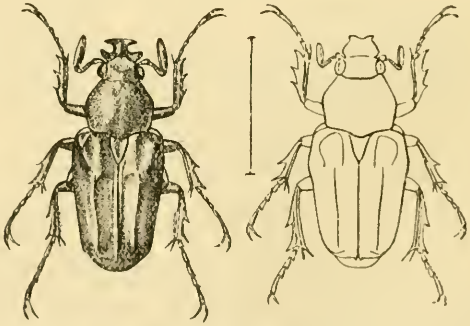

Fig. 10.—*Mycteristes gestroi*, male, and outline of female.

rugose at the base and apex, and the *elytra* cover the abdomen and are rather finely rugose, with a smooth costa about the middle of each, bent and dilated behind the scutellum. The *pygidium* is finely transversely striolated and the lower surface of the body is rugose at the sides and punctured in the middle. Each of the four *posterior tibiæ* is armed with a strong spine beyond the middle of the outer edge.

♂. The head is excavated above and bears a short horizontal lamina behind, which is slightly notched in front. The angles of the clypeus are acuminate and the front margin is produced in the middle into a small horn curving upwards and dilated in front. The club of the antenna is rather long, the front tibiæ and all the tarsi are longer than those of the female, and the abdomen is longitudinally channelled beneath.

♀. The clypeus is simple but the anterior angles are produced into short, blunt processes.

This species is extremely like *M. microphyllus*, but it is a little shorter and the prothorax is less finely and evenly sculptured, distinctly punctured near the middle and broader at the base.

Length 17–18 mm.; *breadth* 8 mm.

Burma: Karen-ni (2700–3300 ft.).

Type in the Genoa Museum.

5. **Mycteristes (Cephalocosmus) auritus**, sp. n.

Coppery, with the head, prothorax, legs and lower surface tinged with red and the elytra with green, the whole body very sparsely clothed with minute yellowish setæ, which are longer upon the head, sternum and sides of the abdomen. It is opaque above, depressed, broad at the shoulders and not very long.

♂. The *head* is coarsely rugose, concave, with the clypeal margin rounded and produced in the middle into a short horn strongly recurved and bifid at the end. The lateral margins of the head just above the antennal sockets are produced upwards and forwards forming a pair of hooked laminæ in front of the eyes. The *pronotum* is rugosely punctured, almost flat, and forms a nearly regular heptagon. The *scutellum* and *elytra* have a silky lustre, and the former is acute, not very long, and bears a few setigerous punctures. The *elytra* are gently sinuated behind the shoulders and taper from there to the end, and each has a strong median costa which is bent towards the shoulder. They are moderately punctured in the anterior part, the punctures changing gradually to longitudinal striolæ. The apical angles are a little produced. The *pygidium* is finely transversely rugose and the *metasternum* and *abdomen* coarsely rugose, but nearly smooth along the middle. The *sternal process* reaches a very little beyond the middle coxæ. The *legs* are slender and the *front tibiæ* slightly curved, furnished with three very inconspicuous teeth at the outer edge and a dense brush of yellow hairs at the inner edge. The *tarsi* are a little longer than the tibiæ.

The ♀ is unknown.

Length 17 mm.; *breadth* 9 mm.

Madras: Nilgiri Hills (*H. L. Andrewes*).

Type in the British Museum.

Genus GNORIMIDIA.

Gnorimidia, *Lansb.*, *Notes Leyd. Mus.* 1887, ix. p. 169.
Cirrhospila, *Kraatz*, *Deutsche Ent. Zeitschr.* 1890, p. 279

Type, *G. toyæ*, Lansb.
Range. S. India.

Form broad and robust, flattened above but scarcely at all depressed in the scutellar region. Head moderately broad, the clypeus deflexed, short and rounded in front. Prothorax strongly rounded at the sides, with the basal lobe feeble and truncate. Scutellum not long, rather broad at the base, with the sides nearly straight. Elytra broad and enfolding the sides of the abdomen, not attenuated behind and very feebly sinuated near the middle of the outer margins. Mesosternum forming a minute tubercle between the middle coxæ. Front tibiæ sharply tridentate. Middle tibiæ armed with a strong spine beyond the middle of the outer edge. Hind tibiæ unarmed. Tarsi slender and antennal club rather long in both sexes.

The sexes differ little, but the abdomen of the male is longitudinally channelled.

Only a single species is known.

6. Gnorimidia toyæ.

Gnorimidia toyæ, *Lansb.*,* *l. c.*
Cirrhospila flavomaculata, *Kraatz*,* *Deutsche Ent. Zeitschr.* 1890, p. 279, pl. 2, fig. 14.

Black and shining, with a broad brick-red stripe upon each elytron extending from the shoulder to the suture just before the apex, and with the following opaque pale yellow markings:- two longitudinal lines upon the head; the sides of the prothorax, a V-shaped mark upon its disc extending to the front angles, and two adjacent spots at the hind margin; the circumference of the scutellum, two large spots near the outer margin of each elytron, an intermediate one near the inner margin, a minute common one behind the last, and the posterior part of the suture and the apical margin; three elongate patches upon the pygidium and a double line of spots on each side of the abdomen beneath.

Fig. 11.—*Gnorimidia toyæ.*

The entire upper surface is coarsely rugose and sparsely dotted with minute setæ. The *prothorax* is transverse, rather convex, with the median part behind very slightly depressed, the sides

rounded in front and strongly contracted behind, and the basal lobe very short, broad and truncated. The *lower surface* is similarly rugose, except the middle of the *abdomen*, which is coarsely punctured and sparingly clothed with short yellow hairs.

♂. The abdomen is very slightly channelled at the base and the antennal club is a trifle longer than in the ♀.

Length 19 mm.; *breadth* 8·5 mm.

MADRAS: Trichinopoli, Kodaikanal.

Type in M. Oberthür's collection; that of *flavomaculata* in the German Entomological National Museum.

Genus **MACRONOTA**.

Macronota, *Hoffmannsegg, Wiedem. Zool. Mag.* I. i. 1817, p. 15; *G. & P., Monogr.* 1832, p. 44; *Burm., Handb. Ent.* iii. 1842, p. 320; *Lacord. Gen. Col.* iii. 1856, p. 506.

Tæniodera, *Burm., op. cit.* p. 325.—Type, *Macr. monacha*, G. & P. (Java, &c.).

Coilodera, *Hope, Gray's Zool. Misc.* 1831, p. 25 (undescribed).

Mecinonota, *Kraatz, Deutsche Ent. Zeitschr.* 1892, p. 375.—Type, *Cet. regia*, F.

Ixorida, *Thoms. Le Naturaliste*, 1880, p. 277.—Type, *Macronota mouhoti*, Wall.

Carolina, *id. l. c.*—Type, *Macr. annæ*, Wall. (♀ of *M. malabariensis*).

Atænia, *Schoch, Gen. & Spec. Cet.* 1895, p. 40.—Type, *Macr. biplagiata*, G. & P. (Java).

Pleuronota, *Kraatz, D. E. Z.* 1892, p. 312.—Type, *P. octomaculata*, Kr. (Java).

Melinospila, *id., D. E. Z.* 1890, p. 277.—Type, *Macr. flavomaculata*, G. & P. (Java).

Bombodes, *Westw., Cabinet of Orient. Entom.* 1848, p. 36.—Type, *Macr. ursus*, Westw.

TYPE, *M. diardi*, G. & P.

Range. The Oriental Region.

Form elongate, with the sides and end of the abdomen distinctly visible from above. Clypeus long and generally slightly bilobed in front. Prothorax narrower than the elytra at the shoulders, with a short posterior lobe not covering the scutellum. Scutellum rather long. Elytron cut away behind the shoulders and distinctly narrowed towards the apices. Pygidium generally prominent. Mesosternum only slightly prominent between the middle coxæ. Legs slender but not long, the front tibiæ armed with three (occasionally only one or two) sharp but short teeth. The upper surface is generally covered with a fine bloom which produces a silky or velvety appearance.

The sexes of *Macronota* frequently differ from each other to a very remarkable degree, but there is no single external feature by which they may be distinguished. In several species, e. g., *M. 4-vittata*, *crucicollis* and *oberthuri*, the colour, pattern and shape are all different. The form of the prothorax is frequently different. In most the ♂ is distinguished by a close fringe of hairs along the

inner edge of the hind tibia or forming a thick brush near its extremity, the hind tarsi are frequently longer, and in some there is a considerable difference in the length of the antennal club.

This is one of the most characteristic and peculiar of Oriental genera. It has been subdivided into numerous so-called genera according to the phases of its very variable outline, but these pass into one another by indefinable degrees.

Macronota elongata, G. & P., although attributed by the authors to Calcutta, is probably not an Indian species. The only examples of authentic origin known to me are from the Malay Peninsula and Sumatra.

Macronota stictica, Hope, said to inhabit Mysore, is a Philippine species. I have found the type to be identical with the later-described *M. guttulata*, Wall.

Key to the Species.

1 (8)	Prothorax dilated from apex to base.	
2 (7)	Abdomen not carinate at the sides.	
3 (6)	Pronotum decorated with 3 pale longitudinal bands.	
4 (5)	Longitudinal bands of pronotum narrow	*diardi*, G. & P., p. 43.
5 (4)	Longitudinal bands of pronotum broad	*penicillata*, Hope, p. 44.
6 (3)	Pronotum decorated with 1 pale longitudinal band	*albonotata*, Blanch., [p. 45.
7 (2)	Abdomen carinate at the sides	*regia*, Fab., p. 46.
8 (1)	Prothorax not dilated from apex to base.	
9 (52)	Middle tibia bearing a strong spine near the middle of the outer edge.	
10 (13)	Clypeus not notched in front.	
11 (12)	Body not thickly hairy..............	*halyi*, Sharp, p. 47.
12 (11)	Body thickly hairy	*sexmaculata*, Kraatz, [p. 47.
13 (10)	Clypeus notched in front.	
14 (17)	Body densely clothed with long hairs.	
15 (16)	Middle tibia armed with one lateral spine	*westwoodi*, Thoms., [p. 49.
16 (15)	Middle tibia armed with two lateral spines	*ursus*, Westw., p. 48.
17 (14)	Body not clothed with long hairs.	
18 (23)	Upper surface metallic.	
19 (22)	Pronotum coarsely, not densely, punctured.	
20 (21)	Body rather short	*flavomaculata*, G. & P., [p. 50.
21 (20)	Body rather long	*sericea*, Gestro, p. 50.
22 (19)	Pronotum densely punctured	*nigricollis*, Jans., p. 51.
23 (18)	Upper surface not metallic.	
24 (45)	Pronotum sharply angulated at the sides.	
25 (26)	Hind tibia spatulate at the tip	*flavofasciata*, Moser, [p. 51.
26 (25)	Hind tibia not spatulate at the tip.	
27 (32)	Mesosternum minutely toothed on its vertical face.	
28 (29)	Sides of elytra strongly sinuated: elytra red in front, black behind....	*malabariensis*, G. & P., [p. 52.

29 (28)	Sides of elytra feebly sinuated: colours of elytra not divided transversely.	
30 (31)	Hind angles of thorax sharp	*bufo*, sp. n., p. 54.
31 (30)	Hind angles of thorax obtuse	*crucicollis*, Lansb., p. 55.
32 (27)	Mesosternum not toothed on its vertical face.	
33 (34)	Sides of elytra feebly sinuated	*oberthuri*, Lansb., p. 55.
34 (33)	Sides of elytra strongly sinuated.	
35 (42)	Scutellum (at least in the middle) dark.	
36 (39)	Two median pale lines of the pronotum converging to a point.	
37 (38)	Each elytron with one minute external spot	*waterhousei*, sp. n., p. 56.
38 (37)	Each elytron with two minute external spots	*sannio*, Jans., p. 57.
39 (36)	Two median pale lines of the pronotum not converging to a point.	
40 (41)	Clypeus dark	*quadrivittata*, Schaum, [p. 58.
41 (40)	Clypeus pale	*ochraceipes*, Waterh., [p. 58.
42 (35)	Middle of the scutellum pale.	
43 (44)	Elytral suture intermittently pale: clypeus bilobed	*indica*, Jans., p. 59.
44 (43)	Elytral suture entirely pale: clypeus feebly notched	*idolica*, Jans., p. 60.
45 (24)	Pronotum not sharply angulated at the sides.	
46 (51)	Pronotum with four longitudinal pale bands.	
47 (50)	Elytra feebly serrated at the apex: antennal club of the ♂ long.	
48 (49)	Middle of the scutellum white	*quadrilineata*, Hope, [p. 61.
49 (48)	Middle of the scutellum dark	*perraudieri*, Fairm., [p. 61.
50 (47)	Elytra strongly serrated at the apex: antennal club of the ♂ short	*virgata*, Jans., p. 62.
51 (46)	Pronotum with one longitudinal pale band	*mouhoti*, Wall., p. 62.
52 (9)	Middle tibia without a spine at the middle of the outer edge.	
53 (54)	Tibiæ and end of clypeus red	*pulchella*, Gestro, p. 63.
54 (53)	Tibiæ and end of clypeus black.	
55 (56)	Without a whitish longitudinal sutural line	*jansoni*, sp. n., p. 64.
56 (55)	With a whitish longitudinal sutural line.	
57 (58)	Pronotum not very coarsely granulated	*antennata*, Wall., p. 65.
58 (57)	Pronotum very coarsely granulated *..	*gracilis*, Arrow, p. 65.

7. Macronota diardi.

Macronota diardi, *G. & P.*, *Monogr.* 1833, p. 313, pl. 61, fig. 5; *Burm. Handb.* iii, p. 320.

Coppery red or green, with the lower surface generally dark and the elytra deep red and shining but scarcely metallic, the surface

* This may perhaps not apply to the male of *M. gracilis*, which is not yet known.

decorated with yellow or orange pubescent patches as follows:—two longitudinal lines on the head; a deeply impressed line at the middle of the pronotum, not extending to the front or hind margin, and a similar one on each side reaching the front, but not the hind, margin; a minute stripe on each side of the apex of the scutellum; a spot at the inner edge of each elytron near the middle of the suture, a similar one behind it, and three short transverse bars at the outer edge alternating with the spots. There are also a large patch upon the pygidium and transverse bars at the sides of the sternum and abdomen, those of the abdomen being visible upon both the upper and lower surfaces.

The body is boat-shaped, narrowing greatly both in front and behind, deeply channelled along the middle line of the back and very smooth above and beneath. The *pygidium* is almost horizontal, finely rugose, and thickly clothed with long hairs, and there are short erect setæ upon the pale lines and spots. The *head* is strongly punctured, except upon a posterior longitudinal keel, and the *clypeus* is bilobed. The *pronotum* is very smooth and shining, except in the neighbourhood of the pale lines, where it is closely punctured, the sides are nearly straight and very divergent towards the base, which is strongly lobed in the middle, and the hind angles are a little produced. The *scutellum* is smooth and very sharp-pointed. The *elytra* have a few striæ upon the posterior half, adjoining the suture, they are coarsely striolated transversely at the sides, where they are largely cut away behind the shoulders, strongly serrated posteriorly and acutely produced at the apical angles. The *metasternum* and *abdomen* are slightly punctured at the sides and very smooth in the middle, and the sternal process is rounded and prominent. The *front tibiæ* are armed with three acute oblique teeth, but the uppermost one is sometimes hardly traceable in the male. The four *posterior tarsi* are rather thick.

The two sexes are almost alike, but the front tibiæ of the male are a little more feebly toothed, the hind tibiæ bear a conspicuous fringe of yellow hairs at the inner edge and the hind tarsi are rather longer.

Length 25–28 mm.; *breadth* 11–12 mm.

TENASSERIM; MALAY PENINSULA; BORNEO; JAVA; SUMATRA.

I have seen two specimens, said to have been taken in Ceylon, of a variety of this species in which the elytra are black and the prothorax purple-black.

8. Macronota penicillata.

Coilodera penicillata, *Hope, Gray's Zool. Misc.* 1831, p. 24.
Macronota penicillata, *Burm., Handb.* iii, 1842, p. 321.
Macronota dives, *G. & P., Monogr.* 1833, p. 314, pl. 61, fig. 6.
Var. Macronota mearesi, *Westw.*,* *Arcana Ent.* i, 1842, p. 104, pl. 28, fig. 3.

Smooth shining black, with the head and prothorax deep purple, and decorated above and beneath with decumbent silky

hairs of a golden orange colour. These are denuded from the clypeus, the frontal carina, the lateral margins, posterior lobe and dorsal carinæ of the prothorax and a smooth elevated lateral ridge on each side of the scutellum in its anterior part. Each elytron is ornamented with a large median yellow patch adjoining the suture, a similar one behind it meeting a smaller apical patch, and three small spots in a line at the outer margin. The mesosternal epimera, the pygidium and the sides of the sternum are thickly clothed, and there is a row of patches on each side of the abdomen. The hairs upon the pygidium are long and erect and form a projecting tuft at the apex.

The body is long, broad at the shoulders and tapering to both extremities, and the whole median part of the back is deeply impressed. The *head* is bilobed in front and has a narrow longitudinal median carina behind. The sides of the *prothorax* are slightly angulated in the middle and strongly converge in front, the hind angles are slightly produced and the basal lobe is strong. There are two straight oblique carinæ which meet in the middle of the front margin and enclose a triangular space which is strongly depressed. The *scutellum* is very long and acutely pointed, and the *elytra* are very broad at the shoulders and strongly cut away behind them, with the outer margins transversely rugose and the posterior sutural part finely striated. All the uncovered parts of the body above and below are extremely smooth and shining. The *sternal process* is short and broad. The *legs* are slender, the *front tibiæ* having three spinose teeth.

The ♂ has the abdomen narrowly channelled beneath.

Length 23 mm.; *breadth* 11 mm.

Sikkim: Darjiling; Assam: Khasi Hills, Manipur; Burma: Karen Hills, 3000 to 4300 ft.

Type lost.

Var. **mearesi**, *Westw.*

This differs from the typical *M. penicillata* in having the light markings of a lemon-yellow instead of deep orange, although the shade is not constant. The patches of pubescence are usually rather smaller in this form, especially the median patch of the prothorax, in which patch the hind margin is commonly prominent, instead of notched, in the middle. The scutellum, on the contrary, is generally more completely covered than in the other form.

Type in the Oxford Museum.

9. Macronota albonotata.

Macronota albonotata, *Blanch., Liste Cet. Mus. Paris,* 1842, p. 19.
Macronota alboguttata, *Parry,* Trans. Ent. Soc. Lond.* v, 1849, p. 182, pl. 18, fig. 3.

Black, with white markings consisting of two longitudinal lines on the head, a narrow median line upon the prothorax, slightly tapering to the front, a longitudinal line upon the scutellum, two

small lateral spots on each elytron, one before and one behind the middle, a sutural pair of spots about the middle of the elytron, a similar pair placed behind the last, and a transverse line near the apex of each elytron. A spot at the middle of the pygidium, the edges of the mesosternal epimera, and spots at the sides of the sternal plates, the hind coxæ and the first, second and fourth abdominal segments, are also white.

The species is broad at the shoulders and tapers considerably to the extremity. The *head* is strongly punctured, with a smooth carina behind and the *clypeus* deeply notched in front. The *prothorax* is densely punctured, strongly depressed behind and very feebly lobed. The sides are divergent from front to back and scarcely at all angulated. The *elytra* are shining, strongly sinuated behind the shoulders, narrowed to the apices and rather strongly carinated along the middle, the part external to the carinæ being coarsely rugose. There are large, not closely set, punctures at the sides of the *metasternum* and all over the *abdomen*.

♂. The hind tibia has a thick fringe of long white hairs at its inner edge, and the hind tarsus is a little longer than that of the ♀.

Length 19 mm.; *breadth* 8 mm.

MADRAS: Nilgiri Hills.

Type in Paris Museum; that of *alboguttata* in coll. O. E. Janson, cotype in the British Museum.

10. Macronota regia.

Cetonia regia, *Fab.*,* *Syst. Eleut.* ii, 1801, p. 159.
Macronota regia, *G. & P.*, *Monogr.* 1833, p. 316, pl. 62, fig. 3; *Wallace, Trans. Ent. Soc. Lond.* 1868, p. 552.
Macronota depressa, *G. & P.*, *Monogr.* 1833, p. 315, pl. 62, fig. 2.

Black, with the clypeus, antennæ, legs, and sometimes the prothorax and elytra, partially or entirely red, and with yellow markings as follows:—two longitudinal lines upon the head; an entire median line and an almost entire lateral one upon each side of the pronotum; the median line of the scutellum, and upon each elytron a line adjoining the suture, beginning behind the scutellum and continued round the apex, a curved discoidal line from the shoulder to near the middle, a lateral line from behind the shoulder to about the middle and a lateral spot behind the last. The middle of the pygidium, parts of the sterna, the mesosternal epimera, and broad lateral lines on the second, third and fifth abdominal segments beneath are also yellow.

It is broad at the shoulders and rapidly narrows towards the extremity. The *clypeus* is rather broad in front and distinctly excised at the middle. The *prothorax* is broadest behind, the sides scarcely angulated before the middle, the posterior angles being almost acute. The disc is strongly depressed along the middle and the posterior lobe strong. The whole upper surface is shining but the depressed parts of the prothorax are rather strongly

punctured and there are a few punctures upon the *elytra*. The pale lines are striated in depressions of the surface. The margins of the elytra are strongly sinuated behind the shoulders. The *abdomen* is sharply keeled along the sides and the white bars interrupted.

The two sexes are almost alike, but the hind tarsi of the male are a little longer than those of the female.

Length 15-17 mm.; *breadth* 8 mm.

ANDAMAN IS.; BURMA: Mergui; MALAY PENINSULA; BORNEO; SUMATRA.

Type in the Copenhagen University Museum.

11. Macronota halyi.

Macronota halyi, *Sharp*,* *Ent. Month. Mag.* xxii, 1886, p. 197.

♂. Black, with the clypeus, antennæ, legs and the greater part of the elytra brick-red, and decorated with orange markings disposed as follows:—two longitudinal vittæ on the head; the surface of the pronotum (with the exception of a bare elevated ridge on each side beginning near the middle of the front margin and terminating at the hind margin just before the angle, a spot at the middle of the hind margin and one before the middle of each lateral margin); the base and apex of the scutellum; the margins of the mesosternal epimera; a common V-shaped mark at the middle of the elytral suture, produced along the latter to near the apex, a transverse apical band and two lateral marks upon each elytron; the front angles of the pygidium and a large median patch, most of the sternum and the posterior part of the abdominal segments at the sides.

The form is robust and not much attenuated behind. The *legs* are rather long and stout, the *front tibiæ* bidentate and the claws large. The *clypeus* is broad, with its front margin strongly reflexed and almost straight. The *prothorax* forms an almost regular heptagon, the sides being strongly angulated in the middle and nearly parallel behind, and the posterior lobe rather strong. The *elytra* are gently sinuated behind the shoulders.

This insect rather strongly resembles the female of *M. quadrivittata*, Schaum, but the form of the clypeus renders it a very easily distinguished species.

♀. Unknown.

Length 17 mm.; *breadth* 8 mm.

CEYLON: Balangoda Ridge (*G. Lewis*).

Type in coll. G. Lewis; cotype in coll. Oberthür.

12. Macronota sexmaculata.

Pleuronota sexmaculata, *Kraatz*,* *Deutsche Ent. Zeitschr.* 1894, p. 141.

Black, with the front of the head and the antennæ reddish, and with a clothing of short fulvous hairs, absent only from the middle

of the metasternum and abdomen. The elytra are decorated with inconspicuous pale yellow spots, viz., a very slight transverse one at the lateral margin before the middle, a larger one behind the middle, and a minute intermediate sutural one. A large round yellow patch occupies the greater part of the surface of the pygidium.

The shape is long and narrow. The *clypeus* is long, with the anterior margin recurved and straight. The vertex is strongly keeled and the pubescence of the head and thorax is longer than that of the elytra. The sides of the *prothorax* are considerably narrowed from the middle forwards and parallel behind. The posterior part is depressed and the basal lobe is rather pointed but not long. The *elytra* are depressed along the suture and the costæ are strong and smooth at their summits. The lateral margins are strongly sinuated behind the shoulders.

♂. The club of the antennæ is very long and the abdomen is slightly excavated beneath. I have not seen the other sex.

Length 18–20 mm.; *breadth* 9 mm.

BHUTAN; BURMA: Taung-ngu.

Type in coll. R. Oberthür.

13. **Macronota ursus.**

Bombodes ursus, *Westw.*,* *Cab. of Orient. Ent.* 1848, p. 36, pl. 17, fig. 4.

Black, with the legs red and the whole body, except the middle of the abdomen, thickly clothed with long erect hairs of a deep brown colour, except those on the legs, and a broad transverse band crossing the elytra near the middle, which are tawny. The hairs upon the pygidium and at the sides of the abdominal segments are sometimes also tawny.

The form is robust and the whole aspect is extremely like that of a Humble Bee. The *clypeus* is not densely hairy and is slightly notched at the end. The *prothorax* is rather globose, not obviously depressed behind and only feebly lobed. The *elytra* are thickly hairy, but with the longitudinal keel upon each smooth. The lateral margins are strongly sinuated behind the shoulders. The front and middle *tibiæ* are short and broad and both are very strongly tridentate at their outer margins.

♂. The club of the antenna is very long, the spurs of the hind tibiæ are blunt, and the outer one is dilated and bent before the extremity.

In the ♀ the outer spur is spatulate and the inner one is broadly bifid at the tip.

Length 18–21 mm.; *breadth* 9–10 mm.

BURMA: Ruby Mines.

Type in the Oxford Museum.

In its form, colouring and thick hairy clothing this curious species departs widely from its generic type, but the divergence is superficial and obviously mimetic. It has the closest possible resemblance to a Humble Bee (*Bombus eximius*, Lep.) which is

very common in the districts in which the beetle has been found. In the bee the body fur is black, except at the tail, and that of the legs bright orange. This is exactly imitated by the beetle, but the latter has also a few long light coloured hairs upon the back, which produce the effect of the reflected light from the folded wings of the bee. When basking in flowers after the manner of its kind there can be no doubt that it could only be distinguished from its model by a very close scrutiny.

A genus was formed by Westwood for this species, but the discovery of other hairy forms has bridged the apparently wide gap by which it was separated from its allies. Divergences mimetically produced are always misleading in classification, and the actual structural differences between these hairy *Macronotæ* are quite as great as any by which they are separated from the more normal forms.

14. Macronota westwoodi.

Bombodes westwoodi, *Thoms.*,* *Arch. Ent.* i, 1857, p. 284, pl. 14, fig. 2.

Black, with the extremities of the elytra, the pygidium, the hind tibiæ and the middle and hind tarsi very dark chestnut-red—the whole body and legs, except the middle of the metasternum and abdomen, clothed with long erect hairs, those on the anterior half of the body and a postmedian transverse band upon the elytra being black, those upon the sides of the metasternum and abdomen, the hind legs and a median transverse band upon the elytra yellow, and those at the extremities of the elytra and the pygidium tawny red. There are long and thick tufts of black hair at the shoulders and towards the extremity of each elytron, a whitish spot (generally more or less triangular) beyond the middle of each outer margin, and a short inconspicuous transverse line before the middle of the suture.

It is much more elongate than *M. ursus*, Westw., and the hairy clothing is less uniformly long. The *legs* are less densely clothed. The whole upper surface is finely rugose, but there is a well-marked smooth longitudinal carina upon each elytron. The *clypeus* is long and feebly bilobed, the *prothorax* much broader than it is long, with the sides strongly angulated a little before the middle, the base broadly lobed and distinctly depressed at the middle, and the *elytra* strongly sinuated behind the shoulders. The *front tibia* is broad and very strongly tridentate, and the *middle tibia* has a single strong spine at the middle of the outer edge.

I have seen only two female examples.

Length 16–17 mm.; *breadth* 8·5 mm.

Sikkim: Darjiling, Mungphu.

Type in coll. R. Oberthür.

This, like the preceding species, is a very striking mimetic form. It is an exact imitation of the Bee, *Bombus assamensis*, Bingh., which the late Col. Bingham informed me he found extremely common in the localities recorded above for the beetle.

15. Macronota flavomaculata.

Macronota flavomaculata, *G. & P., Monogr. Cet.* 1833, p. 314, pl. 62, fig. 1; *Burm., Handb. Ent.* iii, 1842, p. 322.

Shining bronze-green, with the femora, tibiæ and elytra red (the latter with an indefinite dark mark common to both), with pale yellow opaque markings consisting of a sinuated oblique line on each side of the prothorax (interrupted in the ♀) and a minute spot in each lateral angulation and the posterior lobe, the sides and apex of the scutellum, two minute lateral spots on each elytron, one before and the other behind the middle, and two other pairs rather more approximated behind, three spots on the pygidium, the sides of the sternum, and three rows on each side of the abdomen, one above and two beneath.

The form is short and stout. The *clypeus* is rather long and strongly notched in the middle. The *prothorax* is distinctly broader than long, coarsely punctured all over and moderately depressed behind. The sides are strongly angulated about the middle, the hind angles right angles and the posterior lobe not very long. The *elytra* are finely punctured or rugulose and strongly sinuated at the sides. The *legs* are very stout and the *front tibiæ* very strongly 3-toothed.

The ♂ has two narrow yellow lines upon the head and the club of the antenna is long.

The ♀ has a much shorter antennal club, the yellow markings are less defined and the puncturation is coarser.

Length 15·5–19 mm.; *breadth* 7·5–10 mm.

S. India: Madras, Nilgiri Hills (Naduvatam, 7000 ft.), Pondichery; Ceylon (*Melly*).

16. Macronota sericea.

Macronota sericea, *Gestro*,* *Ann. Mus. Genova*, (2) vi, 1888, p. 116, *op. cit.* (2) x, 1891, p. 845.

Bronze, with red and green reflections, the elytra reddish with more or less of the central part obscure; decorated with slight whitish markings, consisting of two short lines upon the head, a marginal line on each side of the prothorax and a median V-shaped mark united to the marginal lines at the front angles (but sometimes absent), a fine line bordering the scutellum, two minute lateral spots (one before and the other beyond the middle), and an apical patch on each elytron and a common cluster about the middle of the suture, the sides of the sternum, the hind coxæ, and four transverse bands on each side of the abdomen.

This is a rather long and narrow insect. The *head* is strongly punctured except upon the frontal carina. The *clypeus* is moderately long and strongly bilobed in front. The *prothorax* is coarsely punctured, thinly setose at the sides, slightly depressed

and rather strongly lobed behind, and the sides are strongly angulated near the middle and nearly parallel behind. The *scutellum* and *elytra* have a silky bloom, and the latter are strongly sinuated at the sides and taper considerably towards the extremities. The costæ are not strong. The *pygidium* is rugose and setose and the *mesosternum* is rather produced but not acuminate.

In the ♂ the hind tibiæ have a thick fringe of yellow hairs along the inner edge, the abdomen is longitudinally grooved and upon the fourth segment a tuft of long hairs occurs in the groove. The depressed part of the prothorax is opaque in this sex.

The ♀ has the prothorax uniformly shining and its sides slightly converging towards the base.

Length 18–20 mm.; *breadth* 9–9·5 mm.

Burma: Kachin Hills, Karen Hills.

Type in the Genoa Museum.

17. Macronota nigricollis.

Atænia nigricollis, *Janson, Cist. Ent.* ii, 1881, p. 604.

Deep bronze, with the elytra bright yellow, lightly suffused with metallic green, the apical part and a few slight vittæ black, and with the apex of the scutellum, the adjoining margins of the elytra, the anterior part of the suture and three adjacent spots at its middle, the margins of the mesosternal epimera and four narrow transverse lines on each side of the abdomen white.

The form is rather short and stout; the *head* thickly punctured and deeply notched in front, with a strong carina behind. The *prothorax* is rather broader than long, thickly punctured, depressed behind, and with a well-developed posterior lobe. The sides are straight and slightly converging behind and abruptly but obtusely angulated before the middle. The *elytra* are strongly sinuated at the sides behind the shoulders and narrowed towards the apices and the costæ are not very prominent. The *antennal club* is very short in both sexes.

The prothorax of the male is velvety, the hind tibiæ have a long fringe of golden hairs towards their extremities, and the hind tarsi are considerably longer than those of the female. The abdomen has a narrow longitudinal channel.

In the female the prothorax is rather shining, more transverse, and more deeply impressed behind.

Length 15–16·5 mm.; *breadth* 7–8 mm.

Assam: Naga Hills, Patkai Hills, Jaintia Hills; Burma: Ruby Mines; Tonkin.

Type in coll. O. E. Janson.

18. Macronota flavofasciata.

Carolina flavofasciata, *Moser, Berl. Ent. Zeitschr.* 1901, p. 527.

Velvety black, with a transverse band across the elytra, the

mesosternal epimera, the sides of the sternum, the hind coxæ, a large patch on each side of the abdomen beneath and a spot on each side of the 2nd segment above lemon-yellow.

It is a large, broad species, scarcely depressed down the middle of the back. The *clypeus* is deeply notched and the frontal carina is not strong. The *prothorax* is about as long as broad, the sides

Fig. 12.—*Macronota flavofasciata*, male, and detail of extremity of hind tibia.

strongly angulated before the middle and parallel behind. The base is broadly lobed. The *elytra* are strongly sinuated at the sides and feebly costate on the disc. The extremity of the *hind tibia* is produced outwards into a leaf-like process and the upper spur is elongated, sinuous and blunt at the end. The club of the *antenna* is short in both sexes.

In the male the extremity of the hind tibia is broader and directed more outwards. The abdomen is not channelled.

The hind tibia of the female bears a strong spine at the middle of its outer edge.

Length 18–21 mm.; *breadth* 9–10·5 mm.

Bhutan; Assam: Naga Hills; Tonkin.

Type in coll. Moser.

The only female specimen (from Mr. O. E. Janson's collection) which I have seen has a small additional yellow spot at the apical margin of each elytron.

19. Macronota malabariensis.

Macronota malabariensis, *G. & P., Monogr. Cet.* 1833, p. 320, pl. 63, fig. 3.
Carolina malabariensis, *Thoms., Le Naturaliste*, 1880, p. 277.
(♀) Macronota annæ, *Wall.*,* *Trans. Ent. Soc. Lond.* (3) iv, 1868, p. 558, pl. 12, fig. 6 (n. syn.).
Carolina annæ, *Thoms., l. c.*

Black, with the elytra mainly or entirely brick-red to beyond the middle and decorated with white or yellow markings above and beneath.

It is compact in form, rather broad at the shoulders and tapering

behind. The *clypeus* is well notched and the *vertex* of the head not carinate. The *elytra* are strongly sinuated at the sides and sharply narrowed behind and the striæ upon the inner posterior part are well marked.

♂. Black, with the anterior half of the elytra brick-red, except a common black patch (generally nearly circular) behind the scutellum, and with the following white markings :—patches at the base and apex of the scutellum and the adjoining margins of the

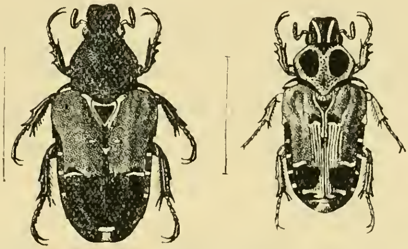

Fig. 13.—*Macronota malabariensis*, male (left). and female (right).

elytra, a slightly angulated line common to both elytra about the middle at the hinder limit of the anterior black patch, and a short transverse lateral postmedian line upon each at the anterior limit of the posterior black patch, a broad longitudinal line at the middle of the pygidium, and the margins of the mesosternal epimera, sternal plates and four abdominal segments, the marginal lines of the last usually coalescing on each side.

The *prothorax* is about as long as it is broad, velvety, not very distinctly punctured and scarcely depressed behind, the sides strongly angulated before the middle and nearly parallel behind, the base not strongly lobed and the posterior angles rather sharp.

♀. Black, with the anterior two-thirds of the elytra brick-red ; the pronotum covered with greyish yellow matter, except a circular patch on each side and a wedge-shaped patch between them ; the scutellum similarly covered, except a central spot. The margins of the elytra adjoining the scutellum, a common V-shaped mark at the middle, the posterior half of the suture, a transverse apical line upon each and a lateral line on each side at the limit of the red area are of the same colour. The middle line of the pygidium, the margins of the mesosternal epimera, the sternal plates and the first four ventral segments are pale, the marginal lines of the last generally coalescing on each side.

It is relatively a little shorter than the male. The *pronotum* is rugose, especially in the hinder part, where, however, there is a smooth elevated carina in the middle. It is slightly transverse, the sides strongly angulated before the middle and slightly

approximating behind, the posterior angles rather obtuse, and the base broadly lobed. The *scutellum* is rugose except in the middle.

Length 15–20 mm.; *breadth* 7·5–9 mm.

Tenasserim: Thagata (*L. Fea*); Malay Peninsula.

Type not traced; type of *annæ* in coll. R. Oberthür and a co-type in the British Museum.

This is another species in which the sexes are strikingly different and have not hitherto been associated, although they have been found together in several different localities. The pronotum of the male is generally entirely black, but there is sometimes a fine marginal white line upon the anterior half. The male specimens from Thagata (in the Genoa Museum) are without the white band upon the pygidium.

The name of the species is evidently due to a mistake in its habitat. The type is said to have inhabited Ceylon, but that locality cannot be accepted.

20. **Macronota bufo**, sp. n.

Brownish, with the head, legs, and lower surface dull metallic crimson; the shoulder, a median longitudinal stripe and another bordering the scutellum and extending to about the middle of the length of each elytron red, decorated with the following yellowish markings:—two longitudinal lines on the head, a lateral border on each side of the pronotum and two discoidal lines converging towards the base, the base and apex of the scutellum, and numerous small indefinite patches upon the elytra. The pygidium (except an indefinite dark spot on each side) and the entire sides of the body beneath, except two rows of small bare spots upon each side of the abdomen, are of the same colour. The body is sparingly clothed with fine inconspicuous greyish setæ except upon the disc of the elytra.

The form is depressed, short and rather broad at the shoulders. The *clypeus* is strongly punctured and notched in front and the *forehead* is longitudinally carinate. The *prothorax* is small, about as long as it is broad, uniformly and very coarsely punctured above, with the sides abruptly angulated before the middle and concave behind, the hind angles sharp and the base strongly lobed. The *elytra* are irregularly striated on the inner part and rugosely punctured at the sides and apices, they are very feebly sinuated at the lateral margins but taper strongly behind. The *pygidium* is closely strigose, the *metasternum* and *abdomen* coarsely punctured in the middle. The *mesosternum* is not produced but rounded in front and bears a small sharp tooth upon its anterior face. The *legs* are rather slender, the *front tibia* bears three sharp teeth and the *middle tibia* bears a sharp spine at its outer edge.

I have not seen the male.

Length 15·5 mm.; *breadth* 7·5 mm.

Madras: Travancore (*G. S. Imray*), Nilgiri Hills, 2,500 ft. (*H. L. Andrewes*).

Type in the British Museum, cotype in coll. H. E Andrewes.

It is probable that the unknown male differs considerably from the female above described. The light markings are no doubt brighter in colour and more sharply defined and some difference in shape may also be expected.

21. Macronota crucicollis.

Tæniodera crucicollis, *Lansb., Notes Leyd. Mus.* ix, 1887, p. 165.
Macronota flavosparsa, *Waterh.,** vars. 1 & 2, *Ann. Nat. Hist.* (6) i, 1888, p. 262 (n. syn.).

The male is silky black ornamented with scattered grey markings and with the elytra occasionally partly red; the female is very opaque, with the elytra brick-red and the whole upper surface covered with a buff-coloured earthy clothing, except the head, upon which there are two longitudinal white lines.

This is a rather small species of moderately elongate shape. The eyes are very prominent and the *clypeus* much dilated anteriorly and feebly emarginate. The *prothorax* is about as broad as it is long, with the sides parallel behind, the hind angles very obtuse and the posterior lobe feeble.

♂. The antennal club is a little longer in the male than in the female, but the abdomen is not grooved beneath. The grey markings consist of two longitudinal lines upon the head; a lateral line at each side of the prothorax extending from near the hind angle to beyond the middle, a pair of spots near the middle of the base and a V-shaped mark, sometimes open behind, extending from the front margin to beyond the middle of the disc; the anterior half of the scutellum and the mesosternal epimera; an irregular sutural patch at the middle of the elytra, a common Ꭓ-shaped mark at their apices, and rather indefinite lateral markings; the base and middle of the pygidium, and two lines of large spots on each side of the abdomen beneath.

The female is almost uniformly buff-coloured, but may exhibit a pair of indistinct dark spots at the elytral suture, and the earthy covering of the pygidium is sometimes divided into three masses.

The original descriptions of the above references apply to the male alone.

Length 14·5–17 mm.; *breadth* 7·8 mm.

MADRAS: Anaimalai Hills, Manaar, Trichinopoli.

Type in coll. R. Oberthür; type of *flavosparsa* in the British Museum.

Mr. H. E. Andrewes has received considerable numbers of both sexes taken simultaneously.

22. Macronota oberthuri.

Tæniodera oberthuri, *Lansb.,* Notes Leyd. Mus.* ix, 1887, p. 167.
(♀) Tæniodera humilis, *Lansb.*, l. c.* p. 166 (n. syn.).

The form and colouring of this species are almost as in

M. crucicollis, Lansb., except that I have seen no specimens with red markings. It is rather larger and broader, and the upper surface is more glossy. The *clypeus* is rather more deeply notched and less widened anteriorly, and the eyes are less prominent. The

Fig. 14.—*Macronota oberthuri*, male (left), and female (right).

hind angles of the *prothorax* are a little more prominent and the posterior lobe rather more pronounced. The posterior margins of the ventral segments of the male are decorated laterally with narrow white bands, the inner ends of which expand and become confluent.

The sexes differ little except in coloration, in which there is no similarity. The male is silky indigo-black with white markings, consisting of two narrow longitudinal lines upon the head; two sinuous longitudinal lines, continuous from the anterior to the posterior margin, at the middle of the prothorax, and a marginal line on each side not reaching the hind border; the anterior part of the scutellum; three or four spots near the lateral edge of each elytron, a large sutural patch, an M-shaped mark behind the last, and a small apical band upon each. The pygidium has a narrow median white line.

The female has two narrow yellow lines upon the head, and the rest of the upper surface is covered with a tawny earthy matter which is more or less denuded at the shoulders and on the costæ of the elytra, and usually leaves also two bare black spots on the pygidium.

Length 16·5–20 mm.; *breadth* 8–9 mm.

MADRAS: Kodaikanal, Shembaganur.

Types of both *oberthuri* and *humilis* in coll. R. Oberthür.

23. Macronota waterhousei, sp. n.

Macronota flavosparsa, vars. 3 & 4, *Waterh.*,* *Ann. Nat. Hist.* (6) i, 1888, p. 262.

Black, with red elytra, more or less decorated with black vittæ, usually consisting of a sutural one enlarged at the middle and a wedge-shaped external one extending from the shoulder to beyond

the middle, and with pale markings which are bright yellow in the male and greyish and rather indistinct in the female.

The body is moderately elongate, and strongly channelled down the middle of the back. The eyes are prominent, the *clypeus* considerably dilated anteriorly and distinctly emarginate. The *prothorax* is about as broad as it is long, the sides nearly parallel behind and the posterior lobe feeble. The sides of the elytra are rather strongly excised behind the shoulders.

♂. The ochreous markings form two longitudinal lines upon the head ; a V-shaped median mark upon the pronotum extending from the front margin to beyond the middle, a curved lateral line, generally interrupted, extending from the median angulation of the side margin to the middle of the base, and occasionally uniting with the V-shaped mark ; the whole periphery of the scutellum ; a small spot below the shoulder of each elytron, a larger one at the middle of the suture and a transverse apical line. The middle of the pygidium and the margins of the abdominal segments at the sides are also broadly ochreous. The club of the antenna is a very little longer in the male than in the female.

The legs are frequently, but not invariably, red in the male and black in the female. The latter is similar to the male but the pale markings consist of a greyish pubescence much more indefinite than the yellow pattern of the other sex.

Length 14·5–20 mm. ; *breadth* 7–9·5 mm.

MADRAS : Nilgiri Hills, Anaimalai Hills.

Type in the British Museum.

24. **Macronota sannio.**

Tæniodera sannio, *Janson, Cistula Ent.* iii, 1883, p. 64.

Black and opaque, with the front of the clypeus, the antennæ and legs testaceous red, the femora partly black ; the elytra more or less red and the upper surface decorated with the following yellow markings :—two longitudinal lines upon the head ; a lateral line upon each side of the prothorax extending from the basal lobe to the lateral angulation and sending a branch to the hind angle, a V-shaped central mark and an intermediate spot on each side—sometimes produced to connect the lateral and discoidal lines ; the base and apex of the scutellum ; and upon the elytra a juxta-scutellar spot on each side, a common median spot slightly produced forward on each side, an apical mark produced at the suture and two lateral spots. There is a large spot upon the pygidium and the abdominal segments are narrowly edged with yellow at the sides.

The form is rather short and broad and gently grooved along the middle line of the back. The *clypeus* is gently excised in front ; the *prothorax* is as long as broad, the sides parallel behind and the posterior lobe not strongly marked. The *elytra* are moderately excised at the sides behind the shoulders. The

antennæ are short in both sexes, which are alike in their form and coloration.

Length 17–18 mm.; *breadth* 8·5–9·5.

MADRAS: Travancore.

Type in coll. O. E. Janson.

25. **Macronota quadrivittata.** (Plate I, figs. 4 & 5.)

Macronota quadrivittata, *Schaum, Trans. Ent. Soc. Lond.* v. 1848, p. 68, pl. 2, fig. 4.
(♀) Macronota sculpticollis, *Thoms.*,* *Typi Cetonidarum*, 1878, p. 15.

♂. Black, with the antennæ and legs reddish, the femora partly black; the elytra more or less red, and the whole surface decorated with yellow markings, consisting of two longitudinal lines on the head, four longitudinal lines on the prothorax, the base and apex of the scutellum, the adjoining margins of the elytra, a common spot at the middle of the suture and a small elongate one on each side immediately before the last, the apical margin of each elytron and a short prolongation along the suture, and two short transverse lines at the outer margin of each. The middle of the pygidium and the outer part of the margins of the ventral segments are similarly decorated, the stripes of the latter being confluent internally.

The upper side is strongly depressed along the middle line. The eyes are prominent, the *clypeus* strongly dilated anteriorly and distinctly notched at the margin. The *prothorax* is rather narrow, the sides strongly angulated before the middle and rather contracted to the base and the basal lobe is slight but rather pointed. The *elytra* are well sinuated at the lateral margins. The *legs* are red, with the femora generally black. The club of the antenna is rather short.

♀. Rather less elongate than the ♂, with the elytra paler and the dorsal markings buff-coloured. The prothorax is entirely buff, with a black median line (interrupted in the middle), two short oblique vittæ at the anterior edge and two parallel ones extending from within the posterior angles to about the middle. The two latter are strongly elevated and shining. The elytral markings are like those of the male but larger and less brightly coloured.

Length 16–19 mm.; *breadth* 7·5–8·5 mm.

CEYLON.

Type in coll. O. E. Janson; that of *sculpticollis* in coll. R. Oberthür.

26. **Macronota ochraceipes.**

Macronota ochraceipes, *Waterh.*,* *Ann. Nat. Hist.* (6) i, 1888, p. 262.
(♀) Tæniodera madurensis, *Moser*,* *Ann. Soc. Ent. Belg.* 1906, p. 277 (n. syn.).

Black, with the front of the clypeus, antennæ and legs reddish-testaceous and the elytra red, with the inner margins and the

central part black—the surface ornamented with pale markings which are bright yellow in the male and dull yellow in the female. It is a large species, of rather narrow elongate shape, and strongly sulcate along the middle line above. The *clypeus* is distinctly notched in front, the *prothorax* relatively small and rather transverse, and the *elytra* are striated near the suture, rugose at the sides and apices, with the lateral margins strongly cut away behind the shoulders. The *pygidium* is rugose and, like the sides of the body beneath, thinly clothed with tawny hair. The club of the antenna is very short.

♂. The upper surface is opaque, with bright orange or yellow markings arranged as follows:—two longitudinal lines upon the head, four upon the prothorax, of which the two internal ones are complete and rather farther apart at the front than at the hind margin, the two outer ones short and directed inwards from the lateral angulation, a common spot at the middle of the elytral suture and a lateral one on each side behind the shoulder There are also one or three spots upon the pygidium and narrow bars at the sides of the ventral segments. The prothorax is punctured and finely setose, with its sides parallel behind and the basal lobe moderately strong.

♀. The markings are like those of the male, but less bright, and in addition to the common elytral spot the greater part of the surface of the elytra (except the longitudinal costæ) is irregularly sprinkled with yellow. It is shining, elongate, moderately broad at the shoulders, and rather depressed above, with a well-raised smooth costa upon each elytron. The prothorax is very rugose except at the basal margin, deeply impressed behind and moderately lobed, with the sides strongly angulated before the middle and parallel behind.

Length 18–22 mm.; *breadth* 8–10·5 mm.

MADRAS: Madura, Shembaganur, Manaar, Anaimalai Hills.

Type in the British Museum; that of *madurensis* in coll. Moser.

27. Macronota indica.

Tæniodera indica, *Janson,* The Entomologist,* vol. xlii, 1909, p. 226.

Black, velvety above, thinly clothed with minute golden yellow setæ and decorated with the following yellow or whitish markings:—two lines extending the whole length of the head; a median **Y**-shaped line extending from the front to the hind margin of the pronotum, a little dilated angularly near the base, and a short lateral line on each side running obliquely inwards from a little before the middle; the entire mesosternal epimera and a broad line along the scutellum; the part of the elytra adjoining the apex of the latter, a common sutural patch behind it, a subhumeral and two lateral spots upon each and a common **X**-shaped mark at the apex. A broad median line upon th

pygidium, the sides of the sternum and four transverse stripes on each side of the abdomen are of the same colour.

The body is rather long and narrow and a little depressed along the scutellar region. The *clypeus* is strongly punctured and bilobed and the *forehead* longitudinally carinate. The *prothorax* is heptagonal, a little broader than long, with the sides strongly angulated before the middle and approximating behind and the posterior lobe very broad and short. The *elytra* are strongly sinuated at the sides and narrowed towards the apices, and each bears a slight longitudinal costa. The *pygidium* is finely rugose.

♂. The upper surface is velvety and opaque, the hind tibia bears a thick tuft of golden hairs on its inner face, and the abdomen is a little channelled beneath.

♀. The upper surface is less opaque, the pronotum a little broader and more rugose, and the hind tarsi shorter. In the type female (the only one I have seen) the pale lines upon the head are scarcely visible and the median Y-shaped thoracic mark is interrupted in front.

Length 15–17 mm.; *breadth* 6·5–7 mm.

ASSAM: Khasi Hills, Manipur.

Type in coll. O. E. Janson.

28. Macronota idolica.

Tæniodera idolica, *Janson,* The Entomologist,* vol. xlii, 1909, p. 225.

Black, with a thin clothing of minute golden-yellow setæ, and decorated with the following yellow or whitish markings:—two lines extending the length of the head; a median Y-shaped mark extending from the front to the hind margin of the pronotum and a little dilated at the base, and a marginal line on each side extending from before the middle to the hind angle; the middle line of the scutellum, the entire sutural margins of the elytra from base to apex, dilated at the middle and apex, and two spots at the outer margin of each. A broad median patch upon the pygidium, the mesosternal epimera, sides of the sternum, and four or five transverse stripes on each side of the abdomen are of the same colour.

The body is long and narrow. The *head* is granulose, with the front margin slightly reflexed and very feebly notched in the middle, and the *forehead* not carinate. The *prothorax* is heptagonal, with the sides angulated before the middle and converging behind, and the basal lobe feeble. The *elytra* are moderately sinuated at the sides and a little narrowed behind, each having a slight longitudinal costa. The *pygidium* is rugose.

♂. The upper surface is velvety and opaque, the prothorax is about as long as it is wide, the hind tibia is rather slender and bears a brush of golden hairs at its extremity, and the abdomen is not hollowed beneath.

♀. The upper surface is scarcely opaque, the prothorax

broader and more rugose. In the only known female specimen (in the British Museum) the pale lines are scarcely visible upon the head and the anterior part of the median thoracic mark is wanting.

Length 14–16 mm.; *breadth* 6–7 mm.

UPPER BURMA: Maymyo (*Col. Bingham*), Momeit (*W. Doherty*).

Type in coll. O. E. Janson.

This species is superficially extremely like *M. indica*, but differs in many particulars. The clypeus is not distinctly bilobed, there is no carina upon the forehead, the lateral line of the pronotum follows the margin and the suture is entirely pale. The curious brush of hairs at the extremity of the hind tibia of the male is also distinctive.

29. Macronota quadrilineata.

Macronota quadrilineata, *Hope,* Gray's Zool. Miscellany*, 1831, p. 24; *Janson, Notes Leyden Mus.* 1892, p. 57.

Black, with the elytra more or less red, and with the following yellow markings:—two longitudinal lines on the head; four slightly wavy lines extending from the front to the hind margin of the pronotum, the outer ones sometimes a little abbreviated in front; a median longitudinal line upon the scutellum, the anterior part of the elytral suture, two pairs of spots adjoining the suture and a transverse apical mark on each elytron. The middle of the pygidium, the greater part of the sternum and broad bands on each side of the abdominal segments are also of the same colour.

The form is elongate; the *clypeus* is long and distinctly notched at the middle, the *prothorax* rather narrow and scarcely depressed behind, and the *elytra* gently sinuated at the sides and narrowed to the extremities, with a slight lateral costa upon each.

♂. The antennal club is very long.

♀. The antennal club is half the length of that of the male, the prothorax is more angulated at the sides and the yellow markings are paler. The outer pale lines of the prothorax are generally abbreviated anteriorly and the lateral lines of the abdomen are reduced.

Length 15–19 mm.; *breadth* 7–8·5 mm.

NEPAL; SIKKIM: Darjiling; ASSAM: Naga Hills, Manipur.

Type in the British Museum.

30. Macronota perraudieri.

Tæniodera perraudieri, *Fairm., Ann. Soc. Ent. Belg.* 1893, p. 294.

The shape and colouring are as in *M. virgata*, Jans. The clypeus and legs are sometimes testaceous-red. The scutellum, instead of a median longitudinal line, has the periphery and the centre black, and the anterior sutural mark of the elytra

sometimes sends a continuation on each side in a straight line towards the shoulder. The elytra are less flattened than those of *M. virgata*, the extremities less produced and less distinctly serrated at the margins.

The club of the antenna is elongate in the male. The female has the prothorax rather broader, with a smooth longitudinal carina along the middle and the sides rather more angulated.

Length 17–19 mm.; *breadth* 7·5–9 mm.

ASSAM: Naga Hills, Patkai Hills, Manipur; INDO-CHINA.

Type in the Paris Museum.

31. Macronota virgata.

Tæniodera virgata, *Janson, Notes Leyd. Mus.* xiv, 1892, p. 59.
Tæniodera quadristrigata, *Kraatz, Deutsche Ent. Zeitschr.* 1892, p. 316, pl. iv, fig. 9.

Black, with the elytra more or less red, and with the following yellow markings:—two longitudinal lines upon the head; four complete longitudinal lines upon the pronotum; the base and middle line of the scutellum; a common Λ-shaped mark upon the elytra behind the scutellum, a pair of closely approximate spots a little behind this, a lateral spot on each side, a very little anterior to the last, and a narrow transverse line near the apex. A spot † at the middle of the pygidium, the greater part of the sternum, and four transverse lines on each side of the abdomen beneath are also yellow.

It is long and narrow and rather flat above. The *clypeus* is deeply notched in front; the *pronotum* narrowed in front and behind, not angulated at the sides, and furnished with a rather pointed basal lobe, which is scarcely depressed. The *elytra* are flat, scarcely costate, strongly narrowed towards the apices, where they are finely serrated. The sides are gently sinuated behind the shoulders.

In the female the prothorax is a little broader and more strongly narrowed behind and the antennal club is shorter.

Length 19–21 mm.; *breadth* 8–9·5 mm.

ASSAM: Silhet, Sudiya, Manipur; BURMA: Taung-ngu.

Type in coll. O. E. Janson; that of *quadristrigata* in the German Entomological National Museum.

32. Macronota mouhoti.

Macronota mouhoti, *Wallace,* Trans. Ent. Soc. Lond.* 1868 (3) iv, p. 555, pl. 12, fig. 4.
Ixorida mouhoti, *Thoms., Le Naturaliste,* 1880, p 277.

Black, sometimes with the elytra deep red, and with the following pale yellow or orange markings:—two longitudinal lines upon the head; a broad median longitudinal band, a little

† In a specimen in Mr. B. G. Nevinson's collection there are four spots in a transverse line.

constricted at the middle, upon the prothorax ; the entire scutellum ; two lateral spots upon each elytron, one before and the other behind the middle, and a sutural line not reaching the scutellum or the apex and greatly enlarged at each extremity. A large circular patch in the middle of the pygidium, the mesosternal epimera, the sides of the sternal plates and large irregular patches at the sides of the abdomen are of the same colour.

It is a rather robust species, flattened above. The *clypeus* is strongly notched in front and carinated behind. The *pronotum* is very finely and densely punctured and clothed with microscopically fine setæ. The sides are not angulated but are arcuate in front and straight behind, in the ♂ very slightly diverging and in the ♀ nearly parallel. The posterior part of the disc is strongly depressed in the middle and the lobe is very short and broad. The sides of the *elytra* are moderately sinuated behind the shoulders and narrowed to the ends. There is a strongly marked carina down the middle of each, the internal portion is rather shining and the external portion finely rugose and opaque. The *abdomen* is rather strongly, but not thickly, punctured.

The abdomen of the ♂ is longitudinally grooved.

Length 15·5–19 mm.; *breadth* 7–9 mm.

Burma : Teinzo ; Siam ; Cochin China.

Type in coll. R. Oberthür; cotype in the British Museum.

33. Macronota pulchella.

Macronota pulchella, *Gestro,* Ann. Mus. Genova,* (2) x, 1891, p. 844.

Black, with the elytra partially, the end of the clypeus, the tibiæ, tarsi and antennal club entirely red ; decorated with yellow markings consisting of two broad lines upon the head, two incomplete lateral lines upon the prothorax and a median V-shaped mark extending from the front to the hind margin, a minute median spot and two lateral ones upon each elytron, a large patch upon the pygidium, patches upon the mesosternal epimera and the sides of the sternum, and four transverse bars upon each side of the abdomen.

This is a small species, elongate and tapering in form. The *head* is moderately broad, with a strong median longitudinal carina, and the *clypeus* gently sinuated in front. The *prothorax* is transverse, closely punctured in the middle and rugose at the sides. It is impressed behind and broadly lobed and the sides are obtusely angulated before the middle. The sides of the *elytra* are gently sinuated behind the shoulders and the dorsal costa is moderately pronounced. The *legs* are rather slender.

♂. The club of the antenna is rather long, and the abdomen is excavated along the middle.

Length 12·5 mm.; *breadth* 5 mm.

BURMA: Karen-ni (*L. Fea*).
Type in the Genoa Museum.
I have seen only a single male specimen (the type).

34. **Macronota jansoni**, sp. n.

Black, with the antennæ orange-red and with three waved transverse blood-red bands upon the elytra, the 1st at the front margins, narrow and interrupted by the scutellum, the 2nd crossing the suture at the middle of the elytra, where it is narrow, and advancing obliquely to the outer margins, where it is dilated, the 3rd consisting of a crescent upon each elytron, narrowly separated at the suture and produced forwards to almost or completely fuse with the median band at the outer margins.

Fig. 15.
Macronota jansoni, male.

It is an elongate species with slender legs. The *clypeus* is feebly bilobed and there is a smooth carina on the vertex. The *prothorax* is short, a little wider than it is long, with the sides angulated before the middle and slightly contracted to the base, and the posterior lobe feeble and depressed. The *scutellum* and *elytra* have a silky lustre, the latter have each a well-marked costa and the lateral margins are very slightly sinuated.

♂. The greater part of the head, a broad V-shaped mark upon the pronotum, the base and apex of the scutellum, a small common spot just before the middle of the elytra and a pair of smaller marginal spots on each side before and behind the last, the middle of the pygidium and the sides of the sternum and abdominal segments, are white.

The head, pronotum and pygidium are finely punctured and opaque, and the posterior angles of the pronotum are sharp. The club of the antenna is long, the front tibia has a long apical tooth and a very feeble lateral one, and the abdomen is strongly arched and furrowed beneath.

♀. The white markings are entirely absent. The head and pronotum are very coarsely rugose (the latter less so along the middle line) and the hind angles of the latter are very obtuse. The pygidium is smooth and shining at the sides and apex, and there are some very large punctures in the middle. The club of the antenna is of moderate length and the front tibiæ are strongly bidentate.

Length 16 mm.; *breadth* 7 mm.
ASSAM: Khasi Hills; SIKKIM.
Type in the British Museum; cotypes in coll. R. Oberthür.

35. Macronota antennata.

Macronota antennata, *Wall.*,* *Trans. Ent. Soc. Lond.* (3) iv, 1868, p. 560.

Black, with brick-red patches upon the elytra, and decorated with pale yellow markings.

It is very narrow and elongate and only slightly tapering. The *head* is relatively rather broad, with a strong longitudinal keel behind and distinctly sinuated at the front margin. The *prothorax* is coarsely granulated, the posterior part depressed and the lobe very slight, so that the scutellum appears very long. The sides of the *elytra* are only very gently sinuated and the costæ are moderately strong. The *legs* are slender.

♂. There are two longitudinal pale lines upon the head, a median line upon the pronotum, bifurcating in front, but not reaching the anterior margin, a broad longitudinal line upon the scutellum, constricted or interrupted in the middle, a patch at the middle of the elytral suture, two lateral spots and an apical one upon each elytron, and patches at the middle of the pygidium, the mesosternal epimera and the sides of the sternum and abdomen. The prothorax is broadest at the base and its sides are strongly angulated before the middle. The club of the antenna is very long and the abdomen strongly excavated beneath.

The ♀ is relatively longer, the prothorax is nearly circular in shape, and the antennal club and the hind tarsi are shorter. The yellow markings are similar to those of the male, but the prothorax has only a short longitudinal line at the posterior part and the pygidium is immaculate.

Length 12 mm.; *breadth* 5 mm.

SIKKIM: Karsiang, Mungphu; PENANG.

Type in coll. O. E. Janson; cotype in the British Museum.

The locality Penang cited by Wallace is very likely erroneous.

36. Macronota gracilis.

Macronota gracilis, *Arrow*,* *Ann. Mag. Nat. Hist.* (7) xix, 1907, p. 350.

Black, with the elytra dark red except for a black patch behind the scutellum produced to the shoulders, a transverse median fascia and the apical margins, and decorated with white markings consisting of a spot behind the scutellum, another at the middle of the elytral suture and two transverse marginal spots on each elytron. The sides of the sternum and the margins of the basal segments of the abdomen are also marked with white.

The form is very elongate, tapering behind, and the legs are

slender. The head, pronotum, and pygidium are coarsely granulated. The *head* is flat, with a smooth tubercle on the vertex and moderately notched in front. The *prothorax* is almost circular in shape, with all the angles almost obsolete, and moderately depressed behind. The *elytra* have a silky sheen and each has a strong costa and is feebly sinuated behind the shoulder. The *front tibiæ* have each three slight teeth, and the four *posterior tibiæ* are without teeth or spines at the middle. The *antennal club* is of moderate length.

The male is not yet known.

Length 15 mm.; *breadth* 6 mm.

ASSAM: Naga Hills (*Doherty*), Khasi Hills; BHUTAN: Maria Basti (*L. Durel*).

Type in the British Museum.

Genus **CLEROTA**.

Clerota, *Burm., Handb. Ent.* iii, 1842, p. 317; *Lacord., Gen. Col.* iii, 1856, p. 504.

TYPE, *C. buddha*, G. & P. (Java).

Range. India and the Malayan Region.

Body very smooth, boat-shaped and longitudinally grooved above at the middle. Clypeus long, almost parallel-sided, deeply and narrowly excised in front. Prothorax dilated to the hind margin and strongly lobed behiud. Scutellum acutely pointed. Sides of the elytra scarcely sinuated and apices flat. Mesosternum strongly produced, slender, curved and acutely pointed. Legs moderately stout; front tibiæ acutely and obliquely tridentate, spurs of the hind tibiæ long. Mandibles rather strong. Maxillæ without teeth. Mentum deeply notched. Palpi truncate.

The front tibiæ are similar in the two sexes, but a little more slender in the male, in which the hind tarsi are considerably longer and the pygidium broader.

Only a single Indian species is known.

37. **Clerota vittigera.**

Macronota vittigera, *Hope,* Proc. Ent. Soc. Lond.* 1841, p. 34; *Westw., Arcana Ent.*, i, 1842, p. 104, pl. 28, fig. 6.
Clerota buddha *var. d, Burm., Handb. Ent.* iii, 1842, pp. 317 & 807.

Black and entirely shining, with orange markings consisting of a median line upon the head, median and lateral lines upon

the pronotum, the entire scutellum and two large spots upon each elytron, placed longitudinally and sometimes coalescing to form a broad stripe which extends from the front margin to a little before the apex. The sides of the pygidium, scutellum, hind coxæ and ventral segments are also orange-coloured.

Fig. 16.
Clerota vittigera.

The *clypeus* is long, scarcely contracted before the eyes, impressed and punctured on each side and biangulatate at the end. The *pronotum* is depressed behind and strongly lobed, and without punctures except near the lateral margins. The latter are elevated, curved, scarcely angulated in the middle and the posterior angles are acute. The *scutellum* is smooth and sharply pointed. The *elytra* have some lines of punctures which do not reach either extremity, and the apices are finely strigose. The *pygidium* is also finely transversely strigose.

The sexual differences have been stated in the generic description.

Length 29–32 mm.; *breadth* 13–15 mm.

SIKKIM: Darjiling, Mungphu; ASSAM: Silhet; BHUTAN: Maria Basti.

Type in the Oxford Museum.

The locality Mysore attributed to the typical specimen is probably a mistake.

Burmeister regarded this (he apparently saw the type) as a variety of the Javanese *Clerota buddha*, G. & P., but it is quite distinct.

Group 3. *HETERORRHINIDES.*

This group contains the majority of the CETONIINÆ in which the head bears horns or processes. The latter are very varied in form and are sometimes peculiar to the male, sometimes possessed by both sexes, and in some of their minor forms confined to the female. The front tibiæ of the male are almost always unarmed externally and those of the female toothed. Another sexual difference, of a very unusual kind, is found in the maxillæ, those of the female having at the end of the lower lobe a sharp tooth, which is absent or blunt in the male.

Most of the species are very smooth and shining, and brilliantly but uniformly coloured, bright green being the predominant shade.

Table of the Genera.

1 (4)	Base of the pronotum not excised before the scutellum.	
2 (3)	Mesosternal process not reaching the front coxæ: horns of the ♂ slender and branched	CYPHONOCEPHALUS, [p. 68.
3 (2)	Mesosternal process slender, produced between the front coxæ: horns of the ♂ not branched or slender	NARYCIUS, p. 70.
4 (1)	Base of the pronotum excised before the scutellum.	
5 (6)	Hind angles of the pronotum a little produced	DICEROS, p. 71.
6 (5)	Hind angles of the pronotum not produced.	
7 (8)	Vertex of the head bearing a bifid process	PLATYNOCEPHALUS, [p. 77.
8 (9)	Vertex of the head not bearing a bifid process.	
10 (19)	Front margin of the clypeus simple.	
11 (12)	Hind angles of the prothorax sharply rectangular, tufted beneath: front tibia of the male toothed	JUMNOS, p. 78.
12 (11)	Hind angles of the prothorax rounded: front tibia of the male unarmed.	
13 (14)	Clypeus abruptly dilated in front	INGRISMA, p. 80.
14 (13)	Clypeus not abruptly dilated in front.	
15 (18)	Clypeus large and elongate.	
16 (17)	Sternal process transverse, dilated in front	TORYNORRHINA, [p. 81.
17 (16)	Sternal process not transverse nor dilated in front	RHOMBORRHINA, [p. 84.
18 (15)	Clypeus small and transverse	EUCHLOROPUS.
19 (10)	Front margin of the clypeus not simple (except in *Heterorrhina mutabilis*, ♂).	[p. 89.
20 (21)	Front margin of the clypeus notched or toothed (except in *H. mutabilis*, ♂) . .	HETERORRHINA, [p. 90.
21 (20)	Front margin of the clypeus bearing a horn dilated at the end	TRIGONOPHORUS, [p. 102.

Genus CYPHONOCEPHALUS.

Narycius, *subgen.* Cyphonocephalus, *Westw.*, *Arcana Ent.* i, 1842, p. 115.

Cyphonocephalus, *Lacord.*, *Gen. Col.* iii, 1856, p. 477.

TYPE, *Narycius olivaceus*, Dup.

Range. S. India.

Form short and broad, rather flattened above. Clypeus very short, feebly sinuated in front and exposing the organs of the mouth regarded from above. Sides of head produced forward and upward forming a pair of horns, short in the female, between which the vertex is concave. Base of the pronotum nearly straight, very slightly prominent before the scutellum, but not lobed, and the hind angles a little produced backward above the

mesosternal epimera; sides broadly rounded in front and approximately parallel behind. Scutellum short, forming an equilateral triangle. Lateral margins of elytra sinuated behind the shoulders. Mesosternum produced, conical, scarcely curved.

♂. Cephalic horns long, curved outwards, with the extremities branched and bent backwards. Prothorax inflated above. Legs longer than those of the ♀, especially the tarsi; tibiæ gently curved and unarmed, the front ones rather elongate. Abdomen longitudinally grooved beneath.

♀. Cephalic horns rudimentary. Front tibiæ short, broad, and strongly tridentate; middle and hind tibiæ straight and each armed with a sharp spine beyond the middle of the outer edge.

Only a single species of the genus is known.

38. Cyphonocephalus olivaceus.

Narycius olivaceus, *Dup., Mag. de Zool.* Cl. ix, v. 1835, pl. 128, fig. 2.
Narycius opalus (♀), *Westw., Arcana Ent.* i, 1842, p. 114; *Burm., Handb. Ent.* iii, 1842, p. 171.
Cyphonocephalus smaragdulus, *Westw., Arcana Ent.* i, 1842, p. 115, pl. 33, fig. 2 (n. syn.).

Bright green, fiery red, or deep blue-black, with the clypeus, cephalic horns, outer edges of the tibiæ, and tarsi of the male black, and with golden-red reflections upon the lower surface.

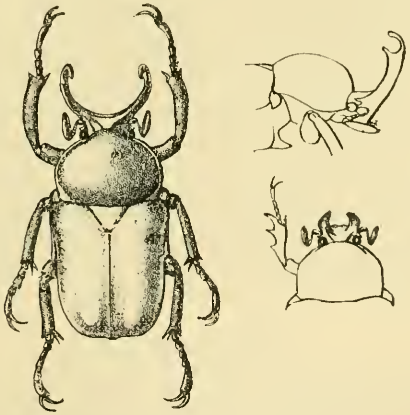

Fig. 17.—*Cyphonocephalus olivaceus*, male, with lateral view (above) and fore part of female (below).

The upper surface is coriaceous and moderately shining. The prothorax is transverse, with the sides almost parallel from the hind angles to beyond the middle and broadly rounded in front, the anterior angles being obliterated and the front margin a little produced above the head. The elytra are punctate-striate, with

the sides slightly approximating behind and sinuated behind the shoulders.

♂. The cephalic horns together form about three-fourths of the circumference of a circle. The tips are blunt and strongly recurved, and a short lateral branch is given off shortly before them. The *prothorax* is rather opaque and strongly inflated above, leaving a narrow flattened margin on each side. The *abdomen* is a little hollowed beneath.

♀. The cephalic horns are short, flat and horizontal, producing the appearance of a false clypeus deeply cleft as in *Thaumastopeus*. The *pronotum* is shining and irregularly and rather coarsely punctured. The *scutellum* is slightly produced at the apex.

Length 23–30 mm.; *breadth* 13–15 mm.

MADRAS: Nilgiri Hills.

Type in coll. R. Oberthür; that of *smaragdulus* in the Bristol Museum of Natural History.

The genus *Cyphonocephalus* was based upon a single, poorly developed, male specimen, and the only other individual hitherto described (Dupont's type) is a female which has been accepted as that of *Narycius opalus*. The figure agrees well with females of the present species which I have examined, and Dupont's statement that the tarsi are longer than those of *N. opalus* seems to me to exclude the possibility of its belonging to that species as Westwood believed.

A good series of *C. olivaceus* has been collected by Mr. H. L. Andrewes and Capt. A. K. Weld Downing, and the latter has supplied some interesting facts regarding its habits. When sitting in the branches of a tree much frequented by it, with a view to capturing specimens, he has often seen two males fighting on the flowers. "They get their horns locked together, and one ends by knocking the other buzzing down the tree. The one knocked down frequently returns to the attack, flying round until he finds his original enemy, and goes for him again. They lower their heads and raise them sharply when fighting, and their horns can be heard five yards away knocking against each other." Capt. Downing has a couple of male specimens with the tip of a horn broken off, probably in such encounters.

Genus **NARYCIUS**.

Narycius, *Dupont, Mag. de Zool.* v, 1835, Cl. ix, pl. 128, fig. 1; *Westwood, Arcana Ent.* 1842, p. 114; *Burm., Handb. Ent.* iii, 1842, p. 170; *Lacord., Gen. Col.* iii, 1856, p. 476.

TYPE, *N. opalus*, Dup.

Range. S. India.

Form rather short and broad, not very convex. Prothorax strongly transverse, with the base very slightly prominent before the scutellum, but not lobed, the hind angles almost covering the mesosternal epimera, the sides broadly rounded in front. Scutellum short, forming an equilateral triangle. Elytra moderately broad,

not tapering behind, with the sides sinuated behind the shoulders. Mesosternal process angular.

♂. Sides of the head above the eyes elevated into strong carinæ which unite posteriorly within the occipital cavity, so that the head appears deeply hollowed out, and are produced anteriorly as a pair of long, approximately horizontal, horns. Head deflected in front so that the mouth is at right angles to the direction of the horns. Anterior tibia rather slender but not elongate, armed with two slight external teeth and two irregular internal ones, and with the terminal spur short and strongly hooked; middle tibia slightly curved; hind tibia straight and fringed at the inner edge. Abdomen longitudinally grooved.

♀. Unknown.

Only one species of the genus is known.

39. **Narycius opalus.** (Plate I, fig. 9.)

Narycius opalus, *Dup., l. c.*; *Westw., Arc. Ent.* i, 1841, p. 5, pl. 1, fig. 5; *id., op. cit.* p. 114; *Burm., Handb. Ent.* iii, 1842, p. 171.

Rosy green and shining, the cephalic horns, elytra, pygidium and lower surface pinkish-testaceous with slight green reflections. The surface is finely coriaceous, with the prothorax and scutellum irregularly punctured, the former having two pits near the hind margin, before the scutellum, and the elytra are striate-punctate.

♂. The cephalic horns may attain two-thirds of the length of the thorax and abdomen together. Their upper edges are nearly straight and parallel, they expand slightly towards the end and the tips are pointed and a little recurved. The prothorax is rather inflated above and is broadest a little before the middle.

Length 22–25 mm.; *breadth* 13 mm.

Madras: Travancore; Nilgiri Hills; Mercara, Coorg.

Type in coll. R. Oberthür.

Narycius olivaceus, Dup., which is said by Westwood (*op. cit.* p. 114) to be the female of this beetle, seems to me to be really that of *Cyphonocephalus smaragdulus*, Westw., to which I have therefore applied Dupont's name.

Genus **DICEROS.**

Diceros, *Lacord., Genera des Coléopt.* iii, 1856, p. 486.
Dicheros, *G. & P., Monogr. Cet.* 1833, p. 40.
Mystroceros, *Burm., Handb. Ent.* iii, 1842, p. 217.

Type, *Cetonia bicornis*, Latr. (= *D. plagiatus*, G. & P.), from Timor.

Range. India and the Malayan Region.

Body very smooth, moderately convex, long and narrow, distinctly tapering from shoulder to apex. Eyes very prominent. Clypeus moderately long, not much dilated, sometimes with the sides produced in the males into a pair of horizontal horns. Prothorax

rather convex above, with the posterior margin trisinuate and the hind angles produced backwards and almost concealing the mesosternal epimera. Scutellum rather short, with the sides sinuated and the apex blunt. Lateral margins of elytra distinctly sinuated and the apical angles acutely produced. Lower surface of body smooth, with the mesosternal process long, narrow and strongly curved. Legs rather short, but not stout, with the tarsi rather thick and closely articulated. Mandible with the chitinous outer lobe rather short and pointed. Maxilla not long, terminating in two hooked teeth internally and a tuft of hairs externally. Mentum emarginate in front.

♂. The abdomen is deeply grooved throughout its length, and the front tibiæ are simple or have only a very feeble upper tooth.

♀. The front tibiæ are bidentate.

Key to the Species.

1	(2)	Clypeus armed in front with a pair of horns or processes, long in the male	*dives*, Westw., p. 72.
2	(1)	Clypeus unarmed.	
3	(6)	Forehead bearing a single median lobe.	
4	(5)	Prothorax entirely black	*roepstorffi*, Wood-Mason, [p. 74.
5	(4)	Prothorax red and black	*childreni*, Westw., p. 74.
6	(3)	Forehead without a median lobe.	
7	(10)	Pronotum very smooth.	
8	(9)	Elytra black, each with a yellow patch	*bimacula*, Wied., p. 75.
9	(8)	Elytra yellow, with narrow black margins	*cuvera*, Newm., p. 75.
10	(7)	Pronotum strongly punctured	*gracilis*, Jans., p. 76.

40. **Diceros dives.** (Plate I, fig. 10, ♀, and fig. 11, ♂.)

Heterorrhina dives, *Westw.*,* *Arcana Ent.* i, 1842, p. 134, pl. 33, fig. 5.
Mystroceros diardi, *Burm.*, *Handb. Ent.* iii, 1842, p. 217.
Gnathocera macleay, *G. & P.*, *Monogr. Cet.* 1833, p. 129, pl. 19, fig. 2.
(♀) Heterorrhina mitrata, *Wall.*,* *Trans. Ent. Soc. Lond.* (3) iv, 1868, p. 528, pl. 11, fig. 1 (n. syn.).

Brilliant green with rosy reflections and with the clypeal processes. antennæ, tibiæ and tarsi (except the inner edges of the front tibiæ and the extreme ends of the hind ones), a large heart-shaped median patch extending from base to apex of the pronotum, the anterior part of the elytra and a broad apical patch reaching the margins of the sides and middle, black. The basal and median part of the pygidium, parts of the front and middle femora, the coxæ, sides of the sternum and abdomen, and the basal part of each ventral segment are deep mahogany colour.

The surface is very highly glazed, and the shape elongate-oval and not very convex. The *head* is slightly punctured, strongly excavated, bicornute in front, with a laminar horizontal process

projecting forward over the excavation from between the eyes. The *pronotum* is very lightly punctured in the middle and more closely and coarsely at the sides. It is strongly transverse, with the sides rounded and not angulated, bordered by an impressed marginal line which is discontinued at about the posterior $\frac{1}{4}$ of its length, and the mesosternal epimera are almost covered by the produced hind angles. The *scutellum* is shortly triangular and moderately sharp at the apex. The *elytra* have rather feeble rows of irregular punctures and are feebly sinuated at the sides and acute at the apical angles. The *pygidium* is very coarsely punctured. The *sternal process* is very slender, acute, and strongly curved. There are large but scattered punctures on the *metasternum* and *legs*, and all the punctures, both above and beneath, are black-pigmented. The *legs* are moderately stout and the front tibiæ rather broad.

♂. The clypeus is nearly straight in front and a pair of long and slender horns spring from its sides just in front of the eyes. They are flattened and nearly parallel, except at the tips, where they are a little incurved and bluntly rounded. The prothorax is narrowed in front, and the elytra are more spinose behind than in the female. The club of the antenna is a little longer. The front tibiæ are quite simple, and the abdomen is channelled along the middle beneath.

♀. Two short angular processes spring from the front margin of the clypeus. The front tibiæ are bluntly bidentate, and all the tarsi are rather shorter than in the male.

Length 19–21 mm.; *breadth* 10 mm.

Bengal (?); Penang.

Type in the Paris Museum, *diardi* having been described from the same specimen; type of *mitrata* in the British Museum.

This beautiful beetle, although discovered so long ago as 1815, is extremely rare, and has been the subject of much discussion. Only a single specimen of the ♂ (the original specimen in the Paris Museum) is yet known. I have been able to make a careful comparison of this with the two female specimens from Penang in the British Museum to which the name *Heterorrhina mitrata* was given by Wallace, and find that they agree so exactly in all points but the armature, that I have associated them as a single species almost without hesitation. I am not convinced, though, that the male was actually brought, as supposed, from Bengal, and M. Lesne, of the Paris Museum, tells me that MM. Diard and Duvaucel, its discoverers, did not collect only within the Indian borders and that the localities in which their specimens were found were not recorded with any precision. It is possible therefore that this species may not really belong to the Indian fauna. It is also possible that it may be found in Lower Burma but not in Bengal.

Dr. Kraatz discussed this species at length (Deutsche Ent. Zeitschr. 1892, p. 370), and concluded that the male type-specimen

was a compound one, having had the head of a quite different species, probably *Diceros peteli*, attached to it. It is true that the head of this specimen has at some time been detached and re-fixed, but it is not the head of *D. peteli*, and there is no reason to consider it other than the original one.

41. Diceros roepstorffi.

Diceros roepstorffi, *Wood-Mason,* Journ. Asiat. Soc. Beng.* 1876, part ii, p. 52.

Shining black above and below, except for a nearly circular orange patch at the outer margin of each elytron a little before the middle.

The *clypeus* is quadrate, with the front margin nearly straight, recurved and slightly produced in the middle, the front part excavated and the posterior part rugosely punctured, broadly elevated in the middle and forming in front a broad arcuate projecting crest. The *prothorax* and *scutellum* are very finely punctured, the former strongly bisinuated and margined at the sides and the marginal lines complete. The *elytra* are very lightly serially punctured and scarcely rugose at the apices. The *pygidium* is finely transversely rugulose, the *metasternum* is coarsely punctured at the sides, and the *ventral segments* have each a row of fine punctures at the middle.

Length 17 mm.; *breadth* 8 mm.

ANDAMAN IS.

Type in the Indian Museum.

42. Diceros childreni.

Heterorrhina childreni, *Westw.,* Arcana Ent.* i, 1842, p. 139, pl. 36, fig. 3.

Shining black, with the pronotum (except a large more or less cruciform black mark at the centre), the scutellum, femora, parts of the sternum and the terminal part of the abdomen deep blood-red, and a large bright yellow patch about half the length of the elytra placed before the middle of each and reaching the outer, but not the inner, margin.

The *clypeus* is quadrate and nearly straight in front, with the margin strongly raised and slightly and broadly produced in the middle, the front part excavated and smooth and the posterior part punctured and provided with a carina which is bluntly produced in front. The *pronotum* is very smooth and convex and exceedingly finely punctured, with the sides strongly bisinuated and margined, the marginal striæ being complete. The *scutellum* has only a very few fine punctures, and the *elytra* are very lightly serially punctured, with the apices slightly rugose. The *pygidium* is finely transversely strigose, the *metasternum*

coarsely punctured at the sides, and the *ventral segments* have each a row of punctures at the middle.

Length 14–18 mm.; *breadth* 7–9 mm.

BENGAL; ASSAM: Khasi Hills, Southern Slopes (Indian Mus.).

Type in the British Museum.

43. Diceros bimacula.

Cetonia bimacula, *Wied.*,* *Zool. Mag.* ii, 1, 1823, p. 85; *Schaum, Ann. Soc. Ent. France*, 1849, p. 252.

Heterorrhina confusa, *Westw.*,* *Arcana Ent.* i, 1842, p. 139, pl. 36, fig. 2.

Gnathocera bimaculata, *G. & P.*,* *Monogr. Cet.* 1833, p. 142, pl. 22, fig. 3.

Shining black, with a blood-red triangular patch upon each side of the pronotum (of which the base extends along nearly the whole lateral margin, the two apices approximating a little before the basal margin) and a large bright yellow patch nearly half the length of the elytra placed before the middle of each and reaching the outer but not the inner margin, the inner angles of each patch being excised. The last segment of the abdomen is deep red above and below.

The *clypeus* is quadrate and straight in front, with the angles broadly rounded, the surface is indistinctly punctured and the central part gently raised. The *pronotum* is smooth, with very fine, scattered punctures, its sides gently sinuated and bordered with a lateral line upon the anterior half only. The *scutellum* is broad and smooth and the *elytra* are very faintly seriately punctured, with the apices slightly rugose. The *pygidium* is finely transversely strigose, the *metasternum* has very large deep punctures at the sides, and each *ventral segment* has a row of punctures at the middle.

Length 16–18 mm.; *breadth* 8–9 mm.

TRAVANCORE: Trivandrum (June); CEYLON.

Type in the Copenhagen Museum; that of *confusa* in the Oxford Museum, that of *bimaculata* in coll. R. Oberthür.

The upper surface is less strongly punctured than that of *D. cuvera*, Newm., the yellow patches upon the elytra are much smaller and the lateral striæ of the pronotum are obsolete behind.

Westwood was unable to recognise this species as that previously described by Wiedemann, but there is no apparent reason for his doubt.

44. Diceros cuvera.

Dicheros cuvera, *Newm.*,* *Ent. Mag.* v, 1837, p. 384.

Shining black, with a deep blood-red patch, irregularly triangular in shape, on each side of the pronotum (the bases reaching the lateral margins and the apices approximating just before the hind

margin) and a very large bright yellow patch upon each elytron, leaving only a narrow black border all round, the external border extremely fine. The inner side of each yellow patch is slightly produced both in front and behind. The terminal segment of the abdomen is deep red.

The *clypeus* is quadrate and straight in front, with the angles broadly rounded, the surface is indistinctly punctured and the whole central part gently raised. The *pronotum* is smooth, with very fine scattered punctures, and its sides are gently sinuated and bordered with striæ which are scarcely abbreviated behind. The *scutellum* is unpunctured, and the *elytra* have each a strongly impressed series of punctures near the suture and several fainter series upon the disc. The *pygidium* is finely transversely strigose, the *metasternum* has very large punctures at the sides, and each *ventral segment* has a row of punctures at the middle.

Length 15–19 mm.; *breadth* 7–9 mm.

BOMBAY: Bombay, Kanara.

Type in the British Museum.

45. Diceros gracilis.

Diceros gracilis, *Janson, The Entomologist,* vol. xlii, 1909, p. 225.

Shining black, with the pygidium, last ventral segment and lateral margins of the prothorax frequently a very deep blood-red, the red thoracic margin being broadly produced inwards just before the base. Each elytron is decorated with a very pale yellow rectangular median patch, not quite twice as long as it is broad, and separated from the outer edge by an extremely fine, and from the inner edge by a moderately broad, black line.

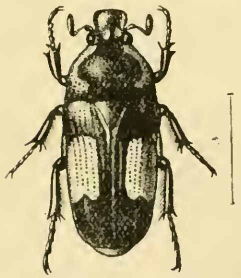

Fig. 18.—*Diceros gracilis.*

This is a very small species of the usual elongate shape, but rather strongly punctured above. The *head* is closely punctured and the *clypeus* simple, rounded, and reflexed at the margin. The *pronotum* is very convex and distinctly punctured all over, with a series of large punctures closely collected in a transverse linear depression on each side before the base; the sides are gently curved and finely margined and the hind angles prominent. The *scutellum* is short and feebly punctured, and the *elytra* are evenly punctured in regular rows which do not quite reach the extremity; the apices are a little rugose. The *pygidium* is finely transversely strigose, the *metasternum* very coarsely and sparsely punctured at the sides and smooth in the middle, and the *abdomen* coarsely punctured at the sides and (in the ♀) more finely and closely in the middle.

Of the six specimens I have seen the males are considerably smaller than the females. The front tibia of the ♂ is feebly bidentate, that of the ♀ strongly so.

Length 11–14·5 mm.; *breadth* 5–6 mm.

Bhutan: Maria Basti; Burma: Tharrawaddy.

Type in coll. O. E. Janson.

Genus **PLATYNOCEPHALUS.**

Narycius, *subgenus* Platynocephalus, *Westw., Trans. Ent. Soc. Lond.* iii, 1854, p. 67.

Type, *P. hamiltoni*, Westw.

Range. Burma.

Prothorax about as broad as it is long, distinctly narrower than the elytra across the shoulders and almost parallel-sided behind, with the base very feebly emarginate before the scutellum. Scutellum very short, scarcely as long as its breadth at the base, with the sides bisinuate and the apex very acute. Elytra rather straight-sided, narrowing from base to apex, with the shoulders prominent and the margins a little sinuated behind the shoulders. Mesosternum produced into a moderately long, sharp, conical process. Maxillæ moderately long, strongly tri-dentate. Mentum broad and flat, with the front margin nearly straight and the posterior part dilated.

♀. Head broad, excavated, with a bifid horizontal process from the vertex overhanging the cavity and the clypeus not reflexed at the margin, broadly excised, with the angles rather sharp. Legs robust, with the front tibiæ broad and armed with three similar oblique teeth.

Although this is a very isolated genus, it is impossible properly to indicate its generic characters, for the male, which in all probability differs greatly from the female, is entirely unknown and it cannot be determined what features are peculiar to one sex. It may even prove to belong to a different group from that in which it is here provisionally located. The single type-specimen, although discovered more than half a century ago, still remains the only known representative of its genus.

46. **Platynocephalus hamiltoni.**

Platynocephalus hamiltoni, *Westw., l. c.* pl. 7, fig. 2.

♀. Testaceous yellow, with the outer margins of the elytra and the abdomen reddish, and the metasternum (but not the mesosternal process), the tibiæ, the shoulders, a lateral band parallel to the outer margins of the elytra, the sutural margins and the extreme margins of the head, prothorax, and scutellum, black.

The body is moderately elongate and rather flat, with the lower surface and the pygidium clothed with minute decumbent grey hairs. The *head* is broader than it is long, coarsely punctured and thinly setose. It is excavated above, the hind margin of the excavation gives rise at the middle to two coalescing processes projecting horizontally forward, and the front of the *clypeus* is arcuately excised, with rather sharp angles. The *prothorax* is thinly punctured, with the sides nearly parallel behind, feebly angulated in the middle, and from there convergent and almost straight. The base is very feebly emarginated before the *scutellum*. The latter is very short, acutely pointed, and has only a few small punctures at the sides. The *elytra* are rather strongly punctate-striate, two of the dorsal intervals being smooth and feebly convex, the rest irregularly punctured, and the apical margins more coarsely and closely punctured. The sides are moderately sinuated behind the shoulders and the apical angles bluntly produced. The *pygidium* is finely rugose, and the sides of the *metasternum* and *abdomen* are strongly punctured. The form of the *front tibia* is rather peculiar, the three teeth being strong, equal and very oblique. All the *tarsi* are rather short.

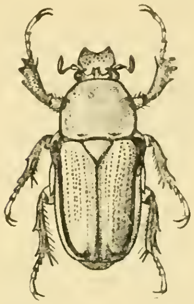

Fig. 19.—*Platynocephalus hamiltoni*, female; natural size.

Length 26 mm.; *breadth* 13 mm.

BURMA: Moulmein.

Type in the British Museum.

Genus JUMNOS.

Jumnos, *Saunders, Trans. Ent. Soc. Lond.* ii, 1839, p. 176, pl. xvi, fig. 1; *Westwood, Cab. of Orient. Entom.* pl. xvii, figs. 1 & 2.

TYPE, *J. ruckeri*, Saund.

Range. North India and Burma.

Form moderately elongate, rather parallel-sided, and smooth and shining above. Clypeus quadrate. Prothorax sinuous at the sides, with the hind angles sharp. Scutellum moderately long and pointed. Elytra sinuated behind the shoulders. Mesosternal process short and flat, rounded or obtusely pointed in front. Front tibiæ bidentate externally.

♂. Clypeus straighter in front than in the ♀. Prothorax more convex. Front legs elongated, with the tibiæ slender, hooked at the end and irregularly toothed beneath. Middle and hind tibiæ more closely fringed at the inner edge. Abdomen impressed beneath.

Key to the Species.

Pronotum without yellow lateral lines; elytra decorated with four very large spots	*ruckeri*, Saund., p. 79.
Pronotum decorated with yellow lateral lines; elytra with four small spots	*roylei*, Hope, p. 79.

47. **Jumnos ruckeri.** (Plate 1, fig. 6.)

Jumnos ruckeri, *Saund. Trans. Ent. Soc. Lond.* ii, 1839, p. 176, pl. xvi, fig. 1; *Westw., Cab. of Orient. Entom.* pl. xvii, figs. 1 & 2.

Deep metallic green, with a large orange spot on the front half of each elytron and a still larger one on the posterior half, the latter usually occupying almost the full breadth of the elytron.

It is a very large insect, elongate in shape, slightly narrowing behind, very smooth and coriaceous above. The *clypeus* rugose, the margins reflexed, the sides straight and very slightly diverging towards the front, and the front margin nearly straight. The *pygidium* is very finely rugose, the *metasternum* rugose and setose, and the *mesosternal process* short and bluntly angular at the end.

♂. The clypeus is granulated and without distinct punctures, and the angles are rather sharp. The prothorax is swollen above, longer than that of the female and a little narrowed towards the base, its surface being less shining and more coriaceous. The front legs are greatly elongated, with the tibiæ strongly but irregularly tuberculated beneath and the terminal external tooth very feeble and blunt. The fringe at the inner edge of the middle and hind tibiæ is close but short, and the middle tibiæ are not toothed externally. The abdomen is broadly impressed along the middle beneath.

Length 37–46 mm.; *breadth* 19–23 mm.

SIKKIM: Darjiling; ASSAM: Manipur; BURMA.

Mr. O. E. Janson has a specimen from Burma in which the yellow patches are almost absent.

48. **Jumnos roylei.**

Cetonia roylei, *Hope*,* *Royle's Himalayas*, 1839, *Entom.* p. 54, pl. 9, fig. 1; *Westw., Arcana Ent.* i, 1842, p. 117, pl. 29, fig. 2.

Deep bronzy brown or green, with a yellow margin at each side of the pronotum, and a round anterior spot and a lunate posterior one, of the same colour, on each elytron.

The form is moderately elongate, with the elytra scarcely narrowed behind. The *head* and *clypeus* are rugose, the *prothorax* strongly punctured, the *scutellum* punctured at the sides, and the *elytra* finely rugose, except in the scutellar region, where they are strongly punctured. The *pygidium* is finely rugose, the

sides of the *metasternum* are coarsely rugose and hairy, and the *mesosternal process* broad and rounded at the end.

♂. There is a distinct median carina upon the head, which is granulose and minutely setose, and the front margin of the clypeus is straight and reflexed. The prothorax is a little more convex than that of the female. The front legs are only slightly elongated, the two external teeth of the front tibia are sharp and equal, the middle tibia has a minute spine at the middle of its outer edge, and the fringes of the four posterior tibiæ are moderately long. The abdomen is arched and longitudinally grooved beneath.

♀. The head is rugosely punctured with the clypeus sometimes feebly bilobed and the margin not reflexed.

Length 19–27 mm.; breadth 9·5–14 mm.

United Provinces: Landaur; Bhutan; Assam: Silhet.

Type in the Oxford Museum.

Dr. Benson found this species abundant in the hollows of oaks.

Genus INGRISMA.

Ingrisma, *Fairmaire, Ann. Soc. Ent. Belg.* xxxvii, 1893, p. 292.

Type, *I. rasuta*, Fairm. (Tonkin).

Range. Burma, Tonkin.

Form elongate and depressed. Clypeus long, constricted, angularly dilated in front, with the front margin rounded and reflexed. Prothorax more or less triangular, with the basal margin very slightly excised before the scutellum. Scutellum rather short, acutely pointed. Elytra strongly sinuated at the sides. Sternal process rather slender, strongly bent downwards, flattened and blunt.

♂. Clypeus more dilated in front. The front legs longer and more slender, and the tibiæ without teeth externally; hind tibiæ furnished with a close-set fringe of golden hairs. Club of the antenna rather long. Abdomen not channelled beneath.

♀. Front tibiæ broader and bidentate; hind tibiæ scarcely fringed.

A single Burmese species is the only representative of the genus known, except the type-species, the female of which bears another name. Another insect from Hainan which has been referred to it is not truly congeneric.

49. Ingrisma euryrrhina.

Heterorrhina euryrrhina, *Gestro,* Ann. Mus. Genova*, 1891, p. 838, pl. 2, figs. 1 & 2.

Ingrisma binghami, *Janson,* Trans. Ent. Soc. Lond.* 1903, p. 308 (n. syn.).

Green, blue, fiery-red, purple or black, above and beneath, with

the sides of the hind coxæ and abdomen, the antennæ and legs reddish, and sometimes also the extreme lateral margins of the prothorax.

It is depressed and elongate in shape, with the sides of the elytra rather straight. The *head* is long and rather rugosely punctured above. The *prothorax* is punctured all over, but very finely in the middle, and the sides are finely margined and sinuated. The *scutellum* is sparingly punctured. The *elytra* are distinctly punctured in rows on the disc and very finely rugose at the lateral and apical margins. The *pygidium* is finely rugose, and the sides of the *metasternum* and *abdomen* strigosely punctured.

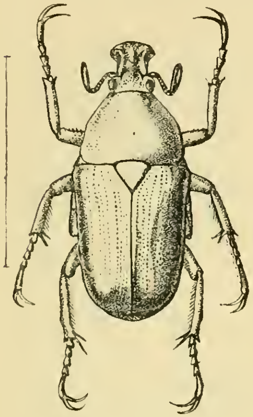

Fig. 20.
Ingrisma euryrrhina, male.

The sexual differences are stated above.

Length 24–30 mm.; *breadth* 12·5 mm.

Burma: Karen-ni; Tenasserim: Thaung-yin Valley.

Type in the Genoa Museum; that of *binghami* in coll. O. E. Janson.

I. binghami, Jans., was based upon a specimen of better development than those previously described by Dr. Gestro.

Genus TORYNORRHINA.

Torynorrhina, *Arrow, Ann. Mag. Nat. Hist.* (7) xix, 1907, p. 433.

Type, *Rhomborrhina distincta*, Hope.

Range. N. India, Burma, China, Japan.

Body elongate and depressed. Clypeus simple, rather long, gradually dilating towards the front, with the anterior margin regularly rounded. Pronotum rather triangular, with the posterior angles well-marked but not produced, and the base moderately excised before the scutellum. Sides of scutellum slightly sinuated and apex acute. Elytra long, not much narrowed from base to apex, sinuated at the sides and rugose at the posterior margins. Sternal process well-developed, broad, dilated and transverse in front, and formed by the mesosternum and metasternum together. Legs moderately long, with the middle and hind tibiæ fringed at the inner edge. Mandibles much reduced. Maxillæ slender, with a long fringe at the extremity. Mentum strongly bilobed.

Front tibiæ slender and unarmed in the ♂, broader, and armed with two sharp oblique teeth in the ♀.

Key to the Species.

1 (4) A dark posterior border to the elytra.
2 (3) Dark border not sharply defined...... *distincta*, Hope, p. 82.
3 (2) Dark border sharply defined .... *apicalis*, Westw., p. 83.
4 (1) Elytra without dark posterior border.
5 (8) Hairy clothing black.
6 (7) Colour blue-black .... *hyacinthina*, Hope, p. 83.
7 (6) Colour green .... *incisa*, sp. n., p. 83.
8 (5) Hairy clothing yellow .... *opalina*, Hope, p. 84.

50. Torynorrhina distincta.

Rhomborrhina distincta, *Hope*,* *Trans. Ent. Soc. Lond.* iii, 1841, p. 63.
Rhomborrhina mellyi, *Burm.* (nec *G. & P.*), *Handb. Ent.* iii, 1842, p. 198; *Westw.*, *Arcana Ent.* i, 1842, p. 118.
Var. Rhomborrhina flammea, *Gestro*,* *Ann. Mus. Genova* (2) vi, 1888, p. 115 (n. syn.).
Var. Rhomborrhina cariana, *id.*,* *op. cit.* (2) x, 1891, p. 837 (n. syn.).
Var. Rhomborrhina ultramarinea, *Nonf.*, *Stettin. Ent. Zeit.* 1906, p. 222 (n. syn.).

Bright metallic green above, varying to golden green, opalescent, fiery-red (var. *flammea*), red, with the scutellum black (var. *cariana*) or deep blue (var. *ultramarinea*), with the lower surface and legs deep green or blue, the abdomen sometimes black, and the posterior margin of the elytra and the pygidium dark and hairy, the posterior border of the elytra not sharply defined.

The *clypeus* is densely and rugosely punctured, the *pronotum* strongly punctured except in the middle, the *scutellum* very minutely and scantily punctured, and the *elytra* irregularly and rather coarsely punctured, with the posterior margins and the hinder part of the lateral margins coarsely rugose. The *pygidium* is coarsely granulated, the sides of the *metasternum* are closely punctured, and the *abdomen* very smooth. The *middle* and *hind tibiæ* are fringed with black hairs at the inner edge.

Length 29–32 mm.; *breadth* 15–16 mm.

BHUTAN; ASSAM: Manipur; BURMA: Karen-ni, Kachin Hills.

Type in the Oxford Museum.

The three succeeding forms are extremely close to the preceding and to one another, and I have only treated them as distinct because, from the good series I have examined, they seem to be less variable in their own localities than *T. distincta*.

51. Torynorrhina apicalis.

Rhomborrhina apicalis, *Westw.,* Arcana Ent.* i, 1842, p. 118, pl. 30, fig. 2; *Schaum, Ann. Soc. Ent. France,* 1849, p. 246.

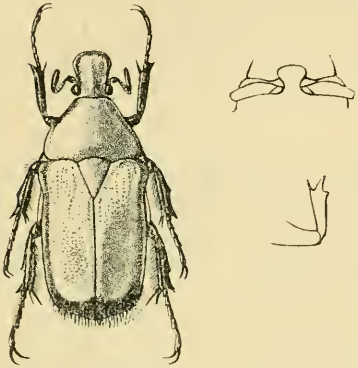

Fig. 21.—*Torynorrhina apicalis,* male (natural size), with details of sternal process and front tibia of the female.

Slightly opalescent pink above and dark olive-green beneath, with the apical edges of the elytra, the pygidium and legs black, the apical black border of the elytra sharply defined in front.

The general form and features are exactly those of *T. distincta*, Hope, but the size is a trifle larger on the whole and the rugose posterior border of the elytra is quite black and sharply defined, instead of merging insensibly into the general colour. The colour of the upper surface is peculiar and, unlike that of the preceding species, seems to be constant.

Length 31–33 mm.; *breadth* 14–16·5 mm.

Sikkim: Mungphu; Nepal.

Type in the Oxford Museum; co-type in the British Museum.

52. Torynorrhina hyacinthina.

Rhomborrhina hyacinthina, *Hope,* Trans. Ent. Soc. Lond.* iii, 1841, p. 62; *Westw., Arcana Ent.* i, 1842, p. 119, pl. 30, fig. 1.

Deep indigo-black, with the head, legs and lower surface rather more distinctly blue.

The form is the same as in the two preceding species, but the upper surface is more strongly and rugosely punctured. The entire surface of the *pronotum* is distinctly punctured (the sides very densely), the *scutellum* is finely but evidently punctured, and the *elytra* are covered with large transverse impressions or punctures. The hairy fringe of the *hind tibiæ* is rather less developed.

Length 32–35 mm.; *breadth* 15–16 mm.

Assam: Khasi Hills, Silhet; Bhutan.

Type in the Oxford Museum.

53. Torynorrhina incisa, sp. n.

Bright metallic green, except a small spot on each humeral callus, the edges of the ventral segments and the tarsi, which are black.

It is a little smaller than *T. hyacinthina*, Hope, more shining and less coarsely sculptured. The *elytra* are densely marked with black-pigmented crescent-shaped impressions, deeply impressed but not very coarse.

Length 30–32 mm.; *breadth* 15–16 mm.

ASSAM: Sudiya, Sibsagar.

Type in the British Museum.

54. Torynorrhina opalina.

Cetonia opalina, *Hope*,* *Gray's Zool. Misc.* 1831, p. 24.
Goliathus opalinus, *G. & P.*, *Monogr. Cet.* p. 186, pl. 26, fig. 5.

Pale pinkish olivaceous green above and beneath, with the scutellum dark green, deepening from base to apex, and the tarsi and edges of the ventral segments black.

This is a rather smaller form than those preceding, very smooth and shining, and less closely punctured. The hairy clothing of the apices of the elytra, the pygidium, sides of the metasternum, and the fringes of the four posterior tibiæ are tawny coloured. The *pronotum* is rather deeply emarginate before the *scutellum*, which is rather short and has distinctly curvilinear sides.

Length 28–33 mm.; *breadth* 13–15 mm.

PUNJAB: Murree; UNITED PROVINCES: Dehra Dun, Mussoori; NEPAL; SIKKIM: Darjiling; TIBET.

Type in the British Museum.

Genus RHOMBORRHINA.

Rhomborrhina, *Hope, Coleop. Man.* i, 1837, p. 120; *Arrow, Ann. Mag. Nat. Hist.* (7) xix, 1907, p. 433.
Anomalocera, *Westw., Arcana Ent.* i, 1842, p. 120; *Arrow, Ann. Mag. Nat. Hist.* (7) xix, 1907, p. 349.
Diphyllomorpha, *Hope, Trans. Linn. Soc.* xix (2), 1843, p. 107.

TYPE, *Goliathus heros*, G. & P.

Range. India, China, Malayan Region.

Form elongate, rather flattened above, generally very smooth and shining. Head flat, without frontal process; clypeus simple, elongate, nearly straight in front, not distinctly toothed or notched. Prothorax rather triangular, with the hind angles not produced and the base excised in front of the scutellum. Scutellum moderately long, acute. Elytra smooth, sinuated at the sides. Sternal process longer than broad, pointed or blunt at the end. Legs moderately slender, with the four posterior tibiæ more or less fringed at the inner edge.

♂. The front tibiæ are slender and unarmed, the club of the antenna is generally long, and the abdomen is arched and sometimes channelled beneath.

♀. The front tibiæ are broader and bidentate externally.

Key to the Species.

1 (6)	Mesosternal process broad, not tapering.	
2 (3)	Green, with a black sutural patch . .	*heros*, G. & P., p. 85.
3 (2)	Uniformly coloured.	
4 (5)	Mesosternal process curved	*mellyi*, G. & P., p. 86.
5 (4)	Mesosternal process straight	*gestroi*, Moser, p. 86.
6 (1)	Mesosternal process narrow and tapering.	
7 (8)	Head relatively small	*microcephala*, Westw., [p. 87.
8 (7)	Head relatively large.	
9 (10)	Elytra extremely glossy, without puncturation	*glaberrima*, Westw., [p. 87.
10 (9)	Elytra punctured, not very glossy.	
11 (12)	Sides of body very hairy beneath . .	*mearesi*, Hope, p. 88.
12 (11)	Sides of body not very hairy beneath	*subopaca*, Arrow, p. 88.

55. **Rhomborrhina heros.** (Plate I, fig. 1.)

Goliathus heros, *G. & P., Monogr. Cet.* 1833, p. 155, pl. 26, fig. 3.

Bright apple-green or blue-green, sometimes with golden or rosy reflections, and with the humeral calli, the sutural margins of the elytra, and the parts adjoining the scutellum and the edges of the ventral segments indigo-black, and the antennæ and tarsi black.

It is long and very smooth. The *clypeus* is rugosely punctured, quadrate, as broad as its length measured from the point of insertion of the antennæ, scarcely dilated at the end, with the front margin straight and minutely produced vertically in the middle. The *prothorax* is minutely coriaceous, punctured at the sides, with the lateral margins feebly angulated in the middle. The *scutellum* is rather small, minutely coriaceous and unpunctured. The *elytra* are very smooth, with a strongly impressed and punctured sutural stria on each and irregularly scattered punctures upon the posterior half, and the margins are coarsely strigose posteriorly. The *pygidium* is evenly and moderately finely rugulose. The *sternal process* is narrow, a little longer than broad measured from the meso-metasternal suture, and blunt at the end. The *metasternum* is thinly but distinctly punctured, except in the middle, and the sides of the *abdomen* are coarsely strigose.

♂. The abdomen is arched but not channelled beneath.

Length 35 mm.; *breadth* 17 mm.

SIKKIM: Mungphu; TONKIN (*Lemée*, 1908).

Type in the Paris Museum.

This is often confused with the Chinese *R. resplendens*, Swartz, which closely resembles it.

56. Rhomborrhina mellyi.

Goliathus mellyi, *G. & P., Monogr. Cet.* 1833, p. 156, pl. 26, fig. 4; *Schaum, Ann. Soc. Ent. France,* 1849, p. 245.
Rhomborrhina dives, *Westw., Trans. Ent. Soc. Lond.* iv, 1845, p. 90, pl. 5, fig. 5.

Bright apple-green, with slight pinkish reflections, especially upon the lower surface, and with the tarsi and antennæ black.

Elongate in shape and very smooth. The *clypeus* is finely rugose, quadrate, about as broad as it is long, measured from the point of insertion of the antennæ, and scarcely widening towards the front margin, which is nearly straight. The *prothorax* is coriaceous, with fine punctures at the sides, the lateral margins feebly angulated in the middle and the base strongly excised before the *scutellum*, which is unpunctured. The *elytra* are very smooth, with scarcely perceptible traces of sutural and discoidal striæ, but rather strongly rugulose near the margins posteriorly. The *pygidium* is rugulose except in the middle. The *sternal process* is narrow, parallel-sided, broadly rounded at the end, and about as long as broad measured from the meso-metasternal suture. The *metasternum* is not distinctly punctured, and the *abdomen* is very smooth except at the sides, which are slightly strigose.

♂. The abdomen is arched but not channelled, and the antennal club and all the tarsi are a little longer than in the female.

Length 31–39 mm.; *breadth* 15–18 mm.

SIKKIM: Darjiling, Mungphu; ASSAM: Khasi Hills, Manipur; BURMA: Shan States, Ruby Mines.

Type in the Geneva Museum.

57. Rhomborrhina gestroi.

Rhomborrhina gestroi, *Moser,* Berl. Ent. Zeitschr.* 1903, p. 317.

Uniform deep violet in colour.

Elongate in form, scarcely tapering behind, and very smooth and shining. The *clypeus* is quadrate, almost as broad as it is long, and very slightly widening towards the front margin, which is straight, strongly reflexed, and slightly prominent vertically in the middle. The *prothorax* is finely coriaceous, not visibly punctured, rather convex and very narrow in front, with the sides feebly angulated in the middle, the hind angles rounded and the base deeply emarginate before the scutellum. The *scutellum* is scarcely visibly punctured, and the *elytra* have only traces of seriate punctures, but their apical margins are strigose. The *pygidium* is rugulose. The *sternal process* is straight, very flat, truncated, a very little constricted and slightly longer than it is wide. The *metasternum* is unpunctured and the *abdomen* feebly strigose at the sides.

♂. The abdomen is slightly arched and channelled beneath, and the antennal club of moderate length.

Length 36 mm.

ASSAM: Shillong.

Type in coll. Moser.

I have seen only the unique type-specimen.

58. **Rhomborrhina microcephala.**

Rhomborrhina microcephala, *Westw.*,* *Arcana Ent.* i, 1842, p. 119, pl. 30, fig. 3; *Thoms. Typi Ceton.* 1878, p. 8.
Anomalocera mearesi, *Burm.* (nec *Hope*), *Handb. Ent.* iii, 1842, p. 781.

Deep olive-brown, with an opalescent lustre, the head, legs and lower surface deep green, and the tarsi and antennæ black.

The body is very smooth and glossy, oval in shape and not very flat. The *head* is small and narrow, the *clypeus* rather longer than it is broad, very slightly dilated in front, with the margins straight and the surface even and finely punctured. The *prothorax* is triangular, excessively finely punctured, and the *scutellum* scarcely punctured. The *elytra* are rugose at the margins posteriorly, the rugosity resolving itself into punctures which become finer anteriorly and vanish about the middle of the elytra. The *pygidium* is rather finely rugose. The *sternal process* is small, narrow and bluntly pointed at the end. The *metasternum* and *abdomen* are sparsely punctured at the sides.

♂. The abdomen is arched but not channelled beneath, and the club of the antenna is not long.

Length 28–30 mm.; *breadth* 14–15·5 mm.

HIMALAYAS.

Type in the Oxford Museum; cotype in coll. Janson.

59. **Rhomborrhina glaberrima.**

Anomalocera glaberrima, *Westw.*,* *Arcana Ent.* i, 1842, p. 136, pl. 34, fig. 1.
Coryphocera hirtiventris, *Redt.*,* *Hügel's Kaschmir*, iv (2), 1848, p. 528.

Deep green, greenish purple, or purplish black.

Moderately convex and elongate in shape, and very smooth and glossy. The *clypeus* is flat, finely and closely punctured, rather narrow, parallel-sided, and as long as it is broad, measured from the point of insertion of the antenna. The *prothorax* is triangular, with the sides nearly straight and the upper surface quite smooth and unpunctured, except for a few fine punctures at the sides. The *elytra* are also quite smooth, except for an incomplete series of punctures upon each, adjoining the suture, and the posterior margins, which are rugose and thinly clothed with yellow hairs. The *pygidium* is rugose and rather thickly clothed with similar

hairs. The *sternal process* is slender, curved and pointed. The *metasternum* is smooth, deeply channelled in the middle and clothed with yellow hairs at the sides, and the *abdomen* is entirely smooth.

♂. The club of the antenna is very long, the middle and hind tibiæ are thickly fringed with yellow hair at the inner edge, and the abdomen is arched beneath and slightly channelled in front.

Length 23–26 mm.; *breadth* 10·5–12 mm.

PUNJAB: Murree; UNITED PROVINCES: Mussoori; SIKKIM: Darjiling.

Type in the British Museum; that of *hirtiventris* in the Vienna Museum.

60. Rhomborrhina mearesi.

Diphyllomorpha mearesi, *Hope*,* *Trans. Linn. Soc.* xix (2), 1843, p. 107, pl. 10, fig. 1.
Anomalocera parryi, *Westw.*,* *Arcana Ent.* i, 1842, p. 120, pl. 30, fig. 6.

Light apple-green above and below, with pinkish reflections above; the antennæ and tarsi brown.

This species is smaller than *R. glaberrima*, rather shorter relatively and less polished above. The *clypeus* is similar in shape and sculpture, but the angles are rather more pronounced. The *prothorax* is also similar, but has fine scattered punctures nearly all over it. The *scutellum* is smooth and the *elytra* finely punctured, some of the punctures arranged in longitudinal rows. The posterior part of the elytral margins and also the *pygidium* are rugose and very scantily clothed with hair. The *sternal process* is slender, pointed and strongly curved. The *metasternum* is smooth and furrowed in the middle, but finely punctured and hairy at the sides, and the *abdomen* is quite smooth beneath, with its sides thickly hairy.

♂. The club of the antenna is still longer than in *R. glaberrima*, the middle and hind tibiæ are thickly fringed with yellow hairs, and the abdomen is channelled beneath.

Length 20–22 mm.; *breadth* 9·5–10·5 mm.

SIKKIM: Darjiling.

Type in the Oxford Museum; *parryi* was described from the same specimen.

61. Rhomborrhina subopaca.

Anomalocera subopaca, *Arrow*,* *Ann. Mag. Nat. Hist.* (7) xix, 1907, p. 348.

Green, with slight opalescent reflections; the antennæ and tarsi nearly black.

Elongate, parallel-sided, rather flat above and not highly glazed. The *clypeus* is granulated, about as long as it is broad, slightly

widening towards the front, with the anterior and lateral margins nearly straight. The *prothorax* is rather shorter relatively than in *R. glaberrima* and *mearesi*, with the sides a little more distinctly angulated in the middle and the base strongly trisinuated; the puncturation very coarse and rugose at the sides but becoming very fine in the middle. The *elytra* are finely and shallowly, but rather closely, strigosely punctured, some of the punctures forming rows anteriorly, the apical and posterior lateral margins are coarsely strigose, but scarcely hairy, and the apical angles are slightly produced. The *pygidium* is densely rugose and clothed with short, not closely-set setæ. The *sternal process* is moderately long, blunt and not much curved. The *metasternum* is densely punctured and pubescent laterally, but smooth and deeply grooved in the middle, and the *abdomen* is almost smooth.

♂. The form is more elongate, the prothorax more narrowed in front, the antennal club long, the hind tibia thickly fringed, and the abdomen deeply channelled beneath.

Length 22 mm.; *breadth* 10–11 mm.

ASSAM: Manipur.

Type in the British Museum.

Genus **EUCHLOROPUS.**

Euchloropus, *Arrow, Ann. Mag. Nat. Hist.* (7) xix, 1907, pp. 350 & 433.

TYPE, *Cetonia læta*, F.

Range. That of the type species.

Rather compact in shape, with the legs stout. Clypeus short and rectangular, with the margins simple, straight and reflexed. Sternal process long and slender, curved and sharply pointed at the end. Club of the antenna very short in both sexes. Elytra deeply striated.

♂. Front tibiæ slender and simple. Hind femora thickened and curved; tibiæ attenuated and strongly curved at the base, and furnished at the inner edge with a thick fringe of yellow hairs. Abdomen arched but not channelled beneath.

♀. Front tibiæ broad and bidentate. Hind legs simple. All the tarsi shorter than those of the male.

Only a single species is known.

62. **Euchloropus lætus.**

Cetonia læta, *F., Syst. Eleut.* ii, 1801, p. 150.
Gnathocera læta, *G. & P., Monogr. Cet.* 1833, p. 135, pl. 20, fig. 6.
Heterorrhina læta, *Westw., Arcana Ent.* i, 1842, p. 137, pl. 34, fig. 2.
Heterorrhina sylhetica, *Thoms.*,* *Mus. Scient.* 1860, i. p. 30; *Gestro, Ann. Mus. Civ. Genova*, 1888, p. 98; *id., op. cit.* 1891, p. 839 (n. syn.).

Bright emerald-green above and below, including the legs and

tarsi, very smooth and glossy, but rather strongly punctured and the punctures pigmented with black.

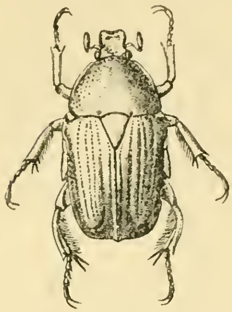

Fig. 22.
Euchloropus lætus, male.

The body is rather broad and convex. The *clypeus* is rectangular, rather broader than long, coarsely punctured and without median carina or processes of any kind, the margins straight and the angles fairly sharp. The *pronotum* is strongly narrowed in front, strongly but not densely punctured at the sides and very finely or not at all punctured in the middle. The *scutellum* is not long, moderately sharp at the apex, and unpunctured. The *elytra* are strongly striate-punctate, with the intervals between the striæ rather convex, and the sides are rather rugose posteriorly. The *pygidium* is transversely strigose, and the *metasternum*, *hind coxæ*, and *abdomen* are strongly but sparingly punctured at the sides and smooth in the middle.

In addition to the sexual distinctions described above the pronotum is more triangular and more narrowed in front in the ♂, and the pygidium is less closely strigose.

Length 19–22 mm.; *breadth* 11–12 mm.

BENGAL: Calcutta: ASSAM: Silhet; BURMA: Karen-ni; MALAY PENINSULA; JAVA; &c.

Type lost; that of *sylhetica* in coll. R. Oberthür.

After a careful comparison of a long series, I am not able to recognise the differences said by Thomson to exist between examples from N. India and Java.

Genus **HETERORRHINA.**

Heterorrhina, *Westw., Arcana Ent.* i, 1842, p. 132.
Coryphocera, *Burm., Handb. Ent.* iii, 1842, p. 220.

TYPE, *Cetonia nigritarsis*, Hope.

Range. Tropical Asia and Africa.

Form variable, but generally elongate, tapering and depressed, with rather slender legs; very shining and free from hair above and beneath. Clypeus not large nor dilated, with the front margin reflexed and (except in the ♂ of *H. mutabilis*) gently toothed or notched, and the forehead in the ♀, or both sexes, bearing a small prominence which is free in front. Prothorax more or less triangular, with the posterior angles well-marked but not produced, and the base excised before the scutellum. Scutellum rather acute at the apex. Sternal process long and slender, except in *H. mutabilis* and *dispar*. Pygidium broad and flat, not hairy.

The front tibiæ are bidentate in the female, and generally slender and unarmed in the male. When teeth are present in both sexes, the upper one is feebler in the male.

Key to the Species.

1 (24)	Clypeus not bilobed.	
2 (5)	Mesosternal process very short.	
3 (4)	Elytra distinctly costate	*mutabilis*, Hope, p. 91.
4 (3)	Elytra not distinctly costate	*dispar*, Arrow, p. 92.
5 (2)	Mesosternal process long.	
6 (9)	Metasternum clothed with moderately thick hair.	
7 (8)	Body rather long and depressed: pygidium granulose	*nigritarsis*, Hope, p. 99.
8 (7)	Body rather short and convex: pygidium strigose. (Front tibiæ bidentate in both sexes.)	*obesa*, Jans., p. 97.
9 (6)	Metasternum not hairy.	
10 (15)	Pronotum strongly and rather evenly punctured.	
11 (12)	Pygidium finely strigose	*leonardi*, Gestro, p. 98.
12 (11)	Pygidium coarsely strigose.	
13 (14)	Tibiæ yellow	*tibialis*, Westw., p. 98.
14 (13)	Tibiæ and tarsi green	*punctatissima*, Westw., [p. 99.
15 (10)	Pronotum not, or very lightly, punctured in the middle.	
16 (19)	Pygidium shining, not closely strigose.	
17 (18)	Elytra highly glazed, scarcely punctured	*elegans*, Fab., p. 93.
18 (17)	Elytra punctured, not highly glazed.	*plumata*, Arrow, p. 94.
19 (16)	Pygidium very closely and finely strigose.	
20 (23)	Pygidium uniformly strigose.	
21 (22)	Frontal lobe broad and truncate in front	*micans*, Guér, p. 95.
22 (21)	Frontal lobe narrow and pointed in front	*gracilis*, Arrow, p. 96.
23 (20)	Pygidium less closely strigose at the base	*sinuatocollis*, Schaum, [p. 96.
24 (1)	Clypeus feebly bilobed.	
25 (28)	Posterior margins of elytra shining.	
26 (27)	Frontal lobe extending to the middle of clypeus	*porphyretica*, Westw., [p. 100.
27 (26)	Frontal lobe extending beyond the middle of clypeus	*amœna*, Hope, p. 101.
28 (25)	Posterior margins of elytra rugose..	*barmanica*, Gestro, p. 101.

63. Heterorrhina mutabilis.

Cetonia mutabilis, *Hope*,* *Gray's Zool. Misc.* 1831, p. 24.
Gnathocera hope, *G. & P.*,* *Monogr. Cet.* 1833, p. 134, pl. 20, fig. 4.
Heterorrhina hopei, *Westw.*, *Arcana Ent.* i, 1842, p. 134, pl. 33, fig. 3.
Coryphocera affinis, *Redt.*,* *Hügel's Kaschmir*, iv (2), 1848, p. 530.
(♀) Cetonia bengalensis, *Hope*,* *Gray's Zool. Misc.* 1831, p. 24.
Heterorrhina bengalensis, *Westw.*, *Arcana Ent.* i, 1842, p. 137, pl. 35, fig. 1.
Gnathocera dorsalis, *G. & P.*, *Monogr. Cet.* 1833, p. 143, pl. 22, fig. 4.
Gnathocera melanaria, *G. & P.*, *l. c.* pl. 22, fig. 5.

The two sexes of this species are remarkably different in form

and colour, and possess little in common except a closely punctured upper surface, costate elytra, short clypeus and very short sternal process.

The male is shining green, blue-green, fiery-red, or purple above and beneath. The body is short, compact and moderately depressed. The *clypeus* is much shorter than it is broad, quadrate, finely rugosely punctured, with the front margin straight, strongly reflexed and not toothed or notched, and the forehead without a distinct carina. The *pronotum* is strongly punctured all over, moderately narrowed in front and sinuated at the sides beyond the middle. The *scutellum* is sparingly punctured. The *elytra* are coarsely and closely punctured in rows which enclose two costæ upon the disc of each, only the punctures towards the sides and apices being irregular. The *pygidium* is rugose. The *sternal process* is narrow, but very short and blunt. The *metasternum* is thinly punctured at the sides and broadly furrowed at the middle, and the *abdomen* is barely punctured and neither channelled nor arched beneath. The front *tibiæ* are unarmed, and the middle and hind *tibiæ* moderately fringed.

The female is black, or brownish black, scarcely shining, elongate, nearly parallel-sided, and more convex than the male. The puncturation is similar, but that of the elytra shallower and less distinct. The *head* is more coarsely rugose, with a posterior carina terminating abruptly in front but scarcely produced. The front margin is a little produced upwards in the middle, the process generally ending in two teeth. The *prothorax* is almost semicircular in shape. All the *tarsi*, especially those of the hind legs, are very short, the *front tibiæ* are broad and bidentate, and the *hind tibiæ* are very scantily fringed at the inner edge.

Length 19–21 mm.; *breadth* 9–10 mm.

UNITED PROVINCES: Dehra Dun, Mussoori; NEPAL; BHUTAN.

Type in the British Museum; that of *hopei* at Oxford; of *affinis* at Vienna; and of *bengalensis* in the British Museum.

64. Heterorrhina dispar.

Heterorrhina dispar, *Arrow*,* *Ann. Mag. Nat. Hist.* (7) xix, 1907, p. 347.

The body is moderately elongate, not much depressed, and rather strongly and uniformly punctured above. The *head* is rugosely punctured, with the *clypeus* rather broader than it is long and the front margin prominent in the middle. The *prothorax* is coarsely and closely punctured, with the interstices extremely finely punctulated. The *scutellum* is punctured, except along the middle line, and the *elytra* rugosely punctured, some of the punctures forming double rows. The *pygidium* is transversely rugose, the *metasternum* smooth in the middle and coarsely punctured at the sides, and the *abdomen* finely punctured. The *sternal process* is short but rather sharp.

♂. Shining olive-green in colour, with the abdomen and legs

reddish. The head is unarmed posteriorly and the clypeus somewhat excavated, with the front margin curved, reflexed and slightly produced in the middle. The sides of the prothorax are strongly angulated in the middle and nearly straight in front and behind.

♀. The colour is purplish black, with castaneous abdomen and legs. The form is more elongate and the upper surface more opaque. The clypeus is strongly excavated, with the front margin

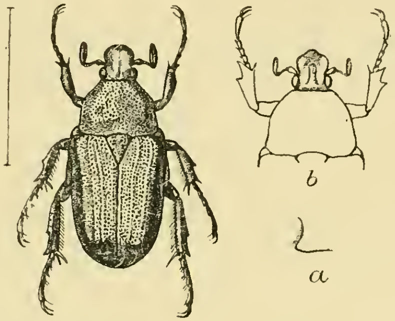

Fig. 23.—*Heterorrhina dispar*, male, with (*a*) lateral outline of sternal process, and (*b*) anterior part of female.

rather strongly produced upwards in the middle, and the forehead is armed with a longitudinal carina freely produced and truncated in front. The prothorax is more convex and less contracted in front than in the male. The legs are stouter, with the front tibiæ strongly bidentate, and all the tarsi shorter and thicker than in the other sex.

Length 20–22 mm.; *breadth* 10–11 mm.

SIKKIM: Darjiling.

Type in the British Museum.

In the peculiar differences of form and colour between the two sexes this species shows relationship only to *H. mutabilis*, Hope, from which it is quite easily distinguished. It is larger and has less distinctly costate elytra, besides which the sternal process, although short, is much less so than in that species, and the clypeus is longer and quite differently shaped both in male and female.

65. **Heterorrhina elegans.**

Cetonia elegans, *Fab.*,* *Spec. Ins.* i, 1781, p. 56; *Westw.*, *Arcana Ent.* i, 1842, p. 138.
Cetonia cuprea, *Herbst*, *Natursyst. Käfer*, iii, 1790, p. 222, pl. 29, fig. 5.
Coryphocera coxalis, *Blanch.*,* *Cat. Col. Paris*, 1850, p. 26.
Var. Heterorrhina anthracina, *Westw.*,* *Cab. Or. Ent.* 1848, p. 36, pl. 17, fig. 7.

Var. Coryphocera fulgidissima, *Kann.*,* *Notes Leyd. Mus.* 1891, p. 182.

Emerald green, blue, fiery red (var. *fulgidissima*), indigo, or black (var. *anthracina*), with the sides of the hind coxæ orange and the antennæ, legs, the sutural margins of the elytra posteriorly and the apical calli black (generally also the humeral calli, but less distinctly).

The form is elongate oval, with the surface very smooth and moderately convex above. The *clypeus* is sparingly punctured, quadrate and parallel-sided, with the front margin straight, strongly recurved, and broadly toothed in the middle, the tooth minutely notched, and the forehead furnished with a lobed longitudinal carina. The *prothorax* is rather narrow in front and feebly punctured at the sides alone. The *scutellum* is unpunctured, and the *elytra* are almost smooth at the sides and apices, with vestiges of seriate puncturation on the disc. The lateral margins are only feebly sinuated. The *pygidium* is coarsely strigose transversely and the *metasternum* and *abdomen* are very sparingly punctured. The *sternal process* is narrow, curved and blunt. The middle and hind *tibiæ* are fringed in both sexes.

♂. The front tibiæ are unarmed, the hind tibiæ bear a tuft of long hairs near the extremity, the hind tarsi are longer than those of the female, and the abdomen is deeply channelled beneath.

Length 21–28 mm.; *breadth* 10–14 mm.

BENGAL: Chapra, Maldah, Chota Nagpur; MADRAS: Mysore, Trichinopoli, Nilgiri Hills; CEYLON.

Type in the British Museum; that of *coxalis* in the Paris Museum; of var. *anthracina* at Oxford and of var. *fulgidissima* in coll. Janson.

Westwood's description and figures are taken not only from the true *H. elegans*, F., but also from *H. micans*, Guér. and *H. sinuatocollis*, Schaum, which he did not distinguish from the present species.

H. elegans is distinguishable from all other Indian species of the genus by its extremely glossy surface, as well as by the black spot near the end of each elytron. The latter varies greatly in size but is rarely very small and sometimes forms a large irregular patch. In the great series in M. Oberthür's collection are examples from Chota Nagpur in which the black pigmentation is considerably developed. The apical patch is large, there is a well-marked humeral spot, the sutural stripe is broad and the scutellum is completely surrounded with black, while vague dark markings are distributed over the pronotum.

66. **Heterorrhina planata**, sp. n.

Uniform bright shining green, with the sides of the hind coxæ orange, and the antennæ and tarsi black.

It is a large species, flattened above and moderately elongate. The *clypeus* is quadrate, broader than it is long, with the front margin straight and reflexed and armed with a broad notched

tooth in the middle. The *forehead* is moderately punctured and bears a rather broad longitudinal carina which forms a short truncate lobe in front. The *prothorax* is triangular, not very convex, and finely punctured. The *scutellum* is very sparingly punctured, and the *elytra* finely but distinctly punctured in rows, with the apical margins rugulose. The *pygidium* is similarly rugulose and the sides of the body beneath exhibit scattered linear punctures. The *sternal process* is slender, curved and bluntly rounded at the end.

The head is similar in both sexes. The front tibia is slender and unarmed in the male and bidentate in the female. The hind tibia of the male is fringed, but the fringe is not very conspicuous nor much longer at the extremitiy of the tibia. The abdomen is deeply channelled in the male.

Length 19–22 mm.; *breadth* 9·5–11 mm.

Bombay: Kanara; Madras: Nilgiri Hills (Mercara, Nodgani).

Type in the British Museum.

This species has been found by Mr. T. R. D. Bell, Mr. H. L. Andrewes and Capt. A. K. W. Downing flying in bamboo jungle at 3000 to 4000 ft. altitude.

67. Heterorrhina micans.

Gnathocera micans, *Guér.*,* *Rev. et Mag. de Zool.* 1840, p. 80.
Var. Gnathocera olivacea, *Guér.*,* *l. c.* (n. syn.).
Heterorrhina olivacea, *Westw.*, *Arcana Ent.* i, 1842, p. 139, pl. 35, fig. 7.

Uniform shining grass-green, olive-green, or deep blue above and beneath.

The form is elongate, oval and moderately convex. The *clypeus* is irregularly punctured, quadrate, and rather wider than it is long, with the front margin straight and slightly produced upwards in the middle, and with a frontal carina, horizontally produced in front. The *prothorax* is finely punctured, except in the middle, with its sides rather strongly sinuated. The *scutellum* is almost unpunctured and the *elytra* finely punctate-striate, with the posterior margins strigose. The *pygidium* is very finely transversely strigose, the *metasternum* coarsely punctured at the sides, and the *abdomen* coarsely but not closely punctured. The *sternal process* is slender, flat, strongly curved and blunt.

In addition to the usual sexual difference in the front tibiæ, the abdomen of the male is smoother and rather shallowly furrowed longitudinally at the base, the hairy fringes of the two posterior pairs of tibiæ are closer and in the last pair form a tuft at the extremity, and the hind tarsi are rather longer than those of the female.

Length 23–26 mm.; *breadth* 11–14 mm.

Bombay. Kanara, Western Ghauts (*R. P. F. Tabourel*); Madras: Travancore, Trichinopoli, Nilgiri Hills, Shevaroy Hills; Bengal: Chota Nagpur.

Type in coll. R. Oberthür: also that of *olivacea*.

68. **Heterorrhina gracilis**, sp. n.

Bright grass-green, sometimes with rosy reflections beneath, and the sides of the hind coxæ yellow.

The body is elongate, depressed above, and quite naked except for a few setæ upon the front and middle coxæ and upon the extremity of the abdomen. The *head* is moderately punctured, with the front margin strongly elevated and bearing at the middle a strong tooth not distinctly bifid. The forehead bears a strong, very narrow longitudinal carina which is freely produced and almost pointed in front. The *pronotum* is triangular and not very convex, very feebly punctured in the middle and strongly at the sides. The latter are very slightly sinuated, the hind-angles very prominent and the base wide and deeply emarginate in the middle. The *scutellum* is scarcely punctured and the *elytra* have impressed lines of moderately strong but rather distant punctures. The sides are strongly sinuated behind the shoulders and the apical margins coarsely strigose, with the angles acutely produced. The *pygidium* is very finely strigose and the *metasternum* and *abdomen* have large elongate impressions at the sides, the metasternum being smooth and the abdomen finely punctured at the middle. The *sternal process* is long, narrow, and blunt at the end. The *front tibiæ* are bidentate in both sexes, and the *hind tibiæ* thinly ciliated.

♂. The front tibia is slender and the upper tooth small but sharp. The abdomen is very feebly impressed along the middle beneath.

Length 19–22 mm.; *breadth* 9·5–11 mm.

MADRAS: Nilgiri Hills (*H. L. Andrewes*).

Type in the British Museum.

69. **Heterorrhina sinuatocollis.**

Heterorrhina sinuatocollis, *Schaum, Ann. Soc. Ent. France*, 1849, p. 249.

Coryphocera smaragdina, *Burm.* (nec *G. & P.*), *Handb. Ent.* iii, 1842, p. 229.

Heterorrhina elegans, *var.*, *Westw. Arcana Ent.* i, 1842, p. 138, pl. 35, fig. 3.

Bright green or indigo-blue, very smooth and shining, with the elytral suture, the tibiæ, tarsi and the apical part of the pygidium piceous or greenish black.

The body is elongate and moderately convex. The *clypeus* is quadrate, strongly and rugosely punctured, and excavated in front, with the front margin strongly reflexed and broadly toothed in the middle, the excavation being overhung by a slight horizontal projection. The *pronotum* is strongly punctured at the sides, more feebly in the middle, with the lateral margins deeply sinuated behind and much narrowed in front. The *scutellum* is rather short and feebly punctured. The *elytra* are strongly punctured in irregular rows, with the apices strigose and the lateral margins very gently sinuated behind the shoulders. The

pygidium is very finely and closely strigose upon its apical half and less closely upon its basal half. The *metasternum* and *abdomen* are smooth in the middle and marked with deep crescentic punctures at the sides. The *sternal process* is slender, moderately long and curved at the apex.

♂. The club of the antenna is rather long. The front tibia is slightly sinuated externally near the apex, the hind femur gently arched, and the hind tibia furnished with a rather long fringe of yellow hairs. The abdomen is deeply and narrowly channelled beneath along the middle.

♀. The pronotum is less narrowed in front and the front tibia is rather broad and bidentate.

Length 18·5–22 mm.; *breadth* 9–9·5 mm.

Bombay: Belgaum.

Type in the Paris Museum.

I am indebted to M. Pierre Lesne, of the Paris Museum, for kindly examining the specimens in that collection, which are the originals of the descriptions of both Burmeister and Schaum, and affording me the information necessary for establishing the identity of the species.

70. **Heterorrhina obesa.**

Heterorrhina obesa, *Janson, Cist. Ent.* iii. 1884, p. 104.

Deep green, blue-green, indigo, purple or fiery red, above and beneath, with the sides of the hind coxæ reddish and the antennæ and tarsi black.

This is a species of rather abnormal form, short, stout and convex, and the sides of the metasternum are clothed with long hairs. The *head* is coarsely punctured and the *clypeus* quadrate, broader than it is long, with the front margin nearly straight, reflexed and broadly toothed in the middle. The *forehead* is provided with a short carina which is slightly lobed in front. The *prothorax* is rather broad, well punctured, and rather strongly sinuated at the sides; the *scutellum* is punctured and the *elytra* are rather rugosely punctured, the punctures arranged in rows upon the disc, and the apical margins strigose. The *pygidium* is transversely strigose, and the *metasternum* and *abdomen* are well punctured, the punctures becoming coarse and strigose at the sides. The *hind tibiæ* have a long but rather thin fringe.

♂. The prothorax is rather more narrowed in front than in the female, the antennal club is longer, and the abdomen is slightly channelled beneath. The front tibiæ are not very slender and are feebly bidentate.

♀. The front tibiæ are broader and strongly bidentate.

Length 18–24 mm.; *breadth* 9·5–14 mm.

Madras: Kodaikanal Mts., Anaimalai Hills, Trichinopoli.

Type in coll. O. E. Janson.

This species was described from Assam, owing to a mistake as to the origin of the first discovered specimens.

71. **Heterorrhina leonardi.**

Heterorrhina leonardi, *Gestro,* Ann. Mus. Genova,* (2) x, 1891, p. 840, pl. 2, figs. 3 & 4.

Grass-green, with the sides of the hind coxæ and the antennæ reddish, and the tarsi black.

The body is rather broad, scarcely tapering behind, and it is strongly punctured above. The *clypeus* is quadrate and rather broad, closely punctured, with the front margin straight and broadly elevated in the middle, the forehead being provided with a semicircular horizontal lobe. The *prothorax* is rather short, rapidly narrowed to the front, and coarsely and uniformly punctured. The *scutellum* is irregularly punctured. The *elytra* are strongly and coarsely punctured in rows, the punctures annular, partly confluent, and leaving two smooth costæ upon each elytron; the apical and posterior lateral margins are rugose. The *pygidium* is finely rugose and the sides of the body beneath are rugosely punctured. The *sternal process* is slender and rather tapering.

♂. The front tibiæ are slender and unarmed and the hind tibiæ have a rather long, but not thick, fringe of golden hairs. The abdomen is neither channelled nor arched beneath.

♀ (which I have not seen). The front tibiæ are bidentate and the front of the clypeus (in the typical specimen) is black.

Length 19 mm.; *breadth* 9 mm.

Burma: Karen-ni (2700 to 4000 ft.).

Type in the Genoa Museum.

72. **Heterorrhina tibialis.**

Heterorrhina tibialis, *Westw.,* Arcana Ent.* i, 1842, p. 136, pl. 34, fig. 6.

Trigonophorus hookeri (♀) *White,* Proc. Zool. Soc.* 1856, p. 14, pl. 41, fig. 2.

Grass-green, with the lower surface usually more yellowish; the tibiæ (except the extremities) and the lateral edges of the hind coxæ testaceous.

The form is rather elongated and depressed, strongly punctured and moderately shining above. The *clypeus* is rugosely punctured, quadrate, very slightly dilated anteriorly, scarcely as long as broad (measured from the point of insertion of the antenna), with the front margin nearly straight, reflexed and, in the female, toothed at the middle. There is a transverse arcuate frontal carina, which is feeble in the male. The *prothorax* is strongly punctured, rather triangular, with the sides very gently curved and strongly approximating in front. The *scutellum* is sparingly punctured. The *elytra* are coarsely punctured, some of the punctures forming rows and enclosing well-marked costæ. The sides and apices are rugose. The *pygidium* is rather rugose, with a distinct impression on each side; the punctures on the *metasternum* are coarse and those on the *abdomen* fine and irregular. The *sternal*

process is moderately long, slightly tapering and blunt. The *legs* are rather slender, and the four *posterior tibiæ* rather narrowly fringed.

This species is not a variable one and the sexes do not conspicuously differ except in the form of the front tibiæ and that of the head, the female having a strong transverse carina before the middle of the clypeus and a strong tooth at the front margin.

Length 21–23 mm.; *breadth* 11–11·5 mm.

Assam: Manipur.

Type in the Oxford Museum; cotype in the British Museum.

73. **Heterorrhina punctatissima.**

Heterorrhina punctatissima, *Westw.*,* *Arcana Ent.* i, 1842, p. 135, pl. 34, fig. 5.

Coryphe jucunda, *Hope* (nec *Germar*), *Trans. Ent. Soc. Lond.* iii, 1841, p. 64.

Bright green, or fiery red, the whole insect above and below uniformly coloured, except the antennæ and tarsi, which are black.

The form is moderately elongated and rather flat. The *head* is rugosely punctured, the *clypeus* being quadrate and shorter than it is broad, with the front margin straight, reflexed and armed with a broad vertical tooth in the middle. The *forehead* is furnished with a short and broad horizontal lobe. The *prothorax* is rather coarsely punctured, the *scutellum* feebly, and the *elytra* strongly and closely, most of the punctures upon the last arranged in regular rows which leave two elevated costæ upon the disc of each elytron. The *pygidium* is evenly transversely strigose, the *metasternum* coarsely punctured except in the middle, where it is smooth, and the abdomen rather sparingly punctured all over. The *sternal process* is straight and blunt at the end.

♂. The frontal lobe is narrow, occupying about a third of the breadth of the clypeus, the front tibiæ are simple, the middle and hind tibiæ thickly fringed, and the hind tarsi longer than those of the female. The abdomen is not channelled beneath.

♀. The frontal lobe is broadly semicircular in shape, occupying nearly the whole breadth of the clypeus, the front tibiæ are bidentate, and the prothorax is rather shorter and less narrowed in front than in the male.

Length 23–26 mm.; *breadth* 12–13 mm.

Assam: Khasi Hills, Sudiya, Silhet, Manipur; Sikkim: Mungphu.

Type in the Oxford Museum; *jucunda* was described from the same specimen.

74. **Heterorrhina nigritarsis.** (Plate I, fig. 2 (male), fig. 3 (female).)

Cetonia nigritarsis, *Hope*,* *Gray's Zool. Miscell.* 1831, p. 24; *Westw.*, *Arcana Ent.* i, 1842, p. 133, pl. 30, figs. 7 & 8.

Gnathocera nigritarsis, *G. & P.*, *Monogr. Cet.* 1833, p. 134, pl. 20, fig. 3.

Var. Cetonia mutabilis, *Westw.* (nec *Hope*), *l. c.* p. 134, pl. 30, fig. 7

Grass-green, golden-green, fiery red, purple or indigo, often

with the elytra (except along the suture), the femora and tibiæ lighter in colour than the rest of the body.

The shape is moderately elongated, the female more oval and compact than the male. The *head* is rather short, rugosely punctured, with a smooth median carina (which is sharply elevated and free in front in the female only). The *clypeus* is rather broader than it is long, with the margins curvilinear and strongly reflexed and the front edge broadly elevated in the middle. The *prothorax* is rather short, narrowed in front in the male, and approximately semicircular in the female, with the sides sinuated beyond the middle and the disc rather strongly punctured all over. The *scutellum* bears a few punctures and the *elytra* are rather coarsely punctured, with two costæ indicated upon the disc of each and the external margins rugose posteriorly. The *pygidium* is rugosely granular and hairy and bears a broad shallow impression on each side. The *metasternum* is coarsely punctured and clothed with yellow hair except in the middle, and the *abdomen* is very smooth. The *sternal process* is not very long and tapers to a point.

The two sexes differ considerably in appearance. The male is more elongate, more shining, and frequently of a brighter colour than the female, and in addition to the different form of the head, prothorax and front tibiæ, the legs and the club of the antenna are more slender. The abdomen is not channelled beneath.

Length 20–23 mm.; *breadth* 10–11 mm.

NEPAL; UNITED PROVINCES: Dehra Dun, Mussoori; PUNJAB: Kulu; SIKKIM: Darjiling.

Type lost; cotype in the British Museum.

75. Heterorrhina porphyretica.

Heterorrhina porphyretica, *Westw.*,* *Trans. Ent. Soc. Lond.* v, 1849, p. 2, pl. 16, fig. 1.

Deep indigo-blue, with the outer margins of the elytra and the three costæ upon each more or less obscurely reddish.

The body is depressed and rather elongate. The *head* is sparingly punctured, the *clypeus* strongly excavated, bilobed in front and broader than it is long, with its sides strongly curved, and the *forehead* armed with a narrow carina strongly lobed in front, the lobe extending to about the middle of the clypeus and sharply pointed at the end. The *prothorax* is distinctly and evenly punctured all over, with its sides gently sinuated and moderately contracted in front. The *scutellum* is distinctly punctured, and the *elytra* are decorated with large annular punctures closely set in double rows, leaving three well-marked costæ upon each elytron. The outer edges are gently sinuated and the apical margins shining, but with coarse transverse punctures. The *pygidium* is slightly rugose, the sides of the *metasternum* coarsely punctured and the *abdomen* moderately punctured. The *sternal process* is slender, curved and pointed.

♂. The frontal lobe is narrower and more pointed, the antennal

club long, the front tibia unarmed, the middle and hind tibiæ fringed with long, but not close-set, pale hairs and the abdomen strongly channelled beneath.

Length 18–20 mm.; *breadth* 8–9 mm.

PUNJAB: Kulu.

Type in the Oxford Museum.

76. Heterorrhina amœna.

Cetonia amœna, *Hope*,* *Trans. Ent. Soc. Lond.* iii, 1841, p. 64; *Westw.*, *Arcana Ent.* i, 1842, p. 135, pl. 34, fig. 4.

Pale green, with the outer margins of the elytra and the costæ yellowish, or entirely yellow, and with the tibiæ and tarsi purplish. All the punctures are black-pigmented.

The shape is depressed and rather elongate. The *head* is sparingly punctured, with the *clypeus* deeply excavated, bilobed in front and moderately long, with strongly curved sides; the *forehead* armed with a strong horizontal lobe extending to beyond the middle of the clypeal cavity and sharply pointed at the end. The sides of the *prothorax* and *elytra* are very gently sinuated and the upper and lower surfaces are sculptured as in *H. porphyretica*.

♂. The frontal lobe is narrower and more acutely pointed than in the female, the front tibia is unarmed, the antennal club long, and the abdomen deeply channelled beneath.

Length 17–20 mm.; *breadth* 8–9 mm.

BHUTAN; BENGAL: Dacca, Shreepur; ASSAM.

Type in the Oxford Museum.

This insect has been found by Mr. H. M. Lefroy frequenting grass.

77. Heterorrhina barmanica.

Heterorrhina amœna, *var.* barmanica, *Gestro*,* *Ann. Mus. Genova*, (2) vi, 1888, p. 99.

Clay-yellow, with a green lustre most apparent upon the forehead, the disc of the pronotum, the scutellum, the furrows of the elytra, and the legs and lower surface; all the punctures pigmented with black.

The form is very elongate and depressed. The *head* is sparingly punctured and strongly excavated, the *clypeus* produced, with the front margin gently bilobed and the sides strongly curved; the *forehead* armed with a strong lobe, moderately slender and angular at the end and free throughout its length, the excavation of the head extending far back between the eyes. The *prothorax* and *scutellum* are distinctly and regularly punctured, the sides of the former strongly angulated at the middle and the posterior angle almost produced. The *elytra* are very feebly sinuated behind the shoulders, rather straight-sided and attenuated behind, with their posterior margins rugose. The puncturation of the elytra, pygidium and under surface are the same as in the preceding species.

The sexes differ as in *H. amœna* and *porphyretica*.

Length 16–21 mm. : *breadth* 8–10 mm.

BURMA : Bhamo (*L. Fea*).

Type in the Genoa Museum.

This was described as a variety of the preceding species, but the head is very markedly longer and the relationship to *H. amœna* is scarcely so close as that of *H. amœna* to *H. porphyretica*.

Genus TRIGONOPHORUS.

Trigonophorus, *Hope, Gray's Zool. Miscell.* 1831, p. 24 : *Westw.*, *Arcana Ent.* i, 1842, p. 120.

TYPE, *Trigonophorus nepalensis*, Hope.

Range. India and Burma.

Body depressed, elongate and naked, with moderately slender legs. Head broad, excavated, the forehead armed with a horizontal lobe directed forwards; the clypeus bearing at the middle of the front margin a triangular horn curving forwards and upwards, slender at the base and broader at the extremity. Sides of the clypeus nearly straight and the angles rounded. Sides of the prothorax curved, posterior angles well-marked, and the base rectilinear, gently emarginate at the middle. Scutellum nearly equilateral, with the sides straight and the apex sharp. Elytra plane, not costate, with the sides distinctly sinuated. Sternal process long. Mandible consisting of a feeble outer lobe and a broad, pubescent membranous inner lobe. Mentum deeply emarginate. Palpi slender.

♂. The legs are rather slender and the front tibiæ unarmed. The posterior cephalic horn is generally acute.

♀. The legs are stouter and the front tibiæ broad and strongly bidentate. The posterior cephalic horn is generally blunt.

All the known species of this genus inhabit our region and all are normally of a nearly uniform green, the legs excepted.

Key to the Species.

1 (4)	Femora not green.	
2 (3)	Femora and tibiæ bright orange......	*nepalensis*, Hope, p. 103.
3 (2)	Femora and tibiæ dark red	*saundersi*, Westw., [p. 103.
4 (1)	Femora green.	
5 (14)	Tibiæ not green.	
6 (13)	Tibiæ reddish.	
7 (10)	Metasternum closely punctured and hairy.	
8 (9)	Clypeal process entire	*gracilipes*, Westw., [p. 104.
9 (8)	Clypeal process bifid	*hookeri*, White, p. 104.

10 (7) Metasternum sparsely punctured, scarcely hairy.
11 (12) Elytra distinctly punctured, metasternum shining .... *scintillans*, Arrow, [p. 105.
12 (11) Elytra indistinctly punctured, metasternum coriaceous .... *feæ*, Gestro, p. 106.
13 (6) Tibiæ black .... *foveiceps*, Gestro, p. 107.
14 (5) Tibiæ green .... *delesserti*, Guér., p. 107.

78. Trigonophorus nepalensis.

Trigonophorus nepalensis, *Hope*,* *Gray's Zool. Miscell.* 1831, p. 24; *Westw.*, *Arcana Ent.* i, 1842, p. 121, pl. 29, fig. 3.
(♀) Trigonophorus hardwickei, *Hope*,* *l. c.*
Rhomborrhina cantori, *Hope*, *Trans. Ent. Soc. Lond.* iii, 1841, p. 62.

Deep green, blue-green, or indigo-black, moderately shining, with the lower surface dark, the femora, tibiæ, and hind coxæ orange-red without any suffusion of green, and the tarsi black.

The form is moderately elongate and convex. The *head* is rather long, excavated, with the *clypeus* closely granulated in front, the sides rounded and scarcely reflexed, and the anterior process slender, gradually dilated, and straight in front. The *prothorax* and *elytra* are coriaceous and finely punctured; the *scutellum* almost unpunctured. The *pygidium* is feebly rugose, the *metasternum* coriaceous and indistinctly punctured, and the *abdomen* almost smooth. The *sternal process* is narrow, curved and directed slightly downwards.

♂. The posterior cephalic process is long and acuminate, and the prothorax narrowed in front.

♀. The posterior cephalic process is truncated and dilated in front and the anterior process short. The prothorax is more transverse and the pygidium rather setose.

Length 28–32 mm.; *breadth* 15 mm.

SIKKIM: Karsiang; BHUTAN; ASSAM: Cachar, Naga Hills, Manipur.

Types of *nepalensis* and *hardwickei* in the British Museum; that of *cantori* in the Oxford Museum.

79. Trigonophorus saundersi.

Trigonophorus saundersi, *Westw.*,* *Arcana Ent.* i, 1842, p. 122, pl. 29, fig. 5.

Shining grass-green, with the lower surface dark, the femora and tibiæ dark purplish red, and the tarsi and antennæ black.

The body is moderately broad and depressed. The *clypeus* is rugose and rather parallel-sided, with the anterior process strongly dilated but not large or slender. The *prothorax* is coriaceous and distinctly punctured at the sides, with the marginal striæ abbreviated behind, the hind angles moderately prominent, and the

base gently excised in the middle. The *scutellum* is barely punctured. The *elytra* are distinctly punctured, some of the punctures forming imperfect rows. The *pygidium* is feebly punctured, the *metasternum* coarsely punctured at the sides, and the *abdomen* smooth. The *sternal process* is slender and curved.

The sexual differences are the same as those of *T. gracilipes.*

Length 30 mm.; *breadth* 15 mm.

SIKKIM: Darjiling.

Type in coll. R. Oberthür; cotypes in the Oxford Museum.

This species is very closely similar to *T. gracilipes* and *T. nepalensis*, from which it is distinguishable by the colouring of the legs and the puncturation of the elytra and metasternum. The lower surface of the body is also darker than in the former species, and the clypeal process does not attain so great a development as that of *T. nepalensis.*

80. Trigonophorus gracilipes.

Trigonophorus gracilipes, *Westw.*,* *Trans. Ent. Soc. Lond.* iv, 1845, p. 88, pl. 4, fig. 5.

Slightly opalescent pea-green, sometimes suffused with fiery red, not very shining, with the tibiæ dull red and the tarsi black.

The body is moderately broad and depressed, and the legs are rather slender. The *head* is strongly excavated, closely granulated and slightly pubescent, with the sides convex and dilated in front; the clypeal process straight in front, not very slender nor broadly dilated. The *prothorax* is coriaceous and punctured at the sides, the *scutellum* with scarcely perceptible punctures, the *elytra* strongly punctured, some of the punctures forming incomplete rows. The sides of the *pronotum* are completely margined, the hind angles rather prominent, and the base gently excised in the middle. The sides of the *elytra* are rather strongly sinuated. The *pygidium* is slightly rugose, the sides of the *metasternum* are well punctured and thinly clothed with pale yellow hair, and the *abdomen* is smooth. The *sternal process* is slender and curved. The *hind tibiæ* have a short fringe of pale hairs.

♂. The posterior cephalic process is triangular, and the prothorax tapers to the front.

♀. The posterior cephalic process is long, moderately broad, nearly parallel-sided, and slightly emarginate in front. The prothorax is broad.

Length 26–28 mm.; *breadth* 13·5 mm.

SIKKIM: Darjiling, Mungphu; BHUTAN; ASSAM: Manipur.

Type in the Oxford Museum.

81. Trigonophorus hookeri.

Trigonophorus hookeri, *White*,* *Proc. Zool. Soc.* 1856, p. 14, pl. 41, fig. 1.

Trigonophorus parvus, *Kraatz*, *Deutsche Ent. Zeitschr.* 1894, p. 295.

Bright green, indigo, or deep blue, with the tibiæ, the femora

wholly or partly, and the sides of the hind coxæ orange-red, and the tarsi black.

This is a small species, rather elongate in form, depressed above and strongly, almost rugosely, punctured. The *head* is rather parallel-sided, excavated and granulated, with the margins not much elevated and the anterior process bifid, with the points not very divergent. The *prothorax* and *elytra* are coriaceous and strongly punctured, and there are rudimentary costæ upon the latter. The sides of the prothorax are sinuated and completely margined, the hind angles rather prominent and the base strongly excised before the *scutellum*, which bears a few fine punctures. The sides of the *elytra* are rather strongly sinuated behind the shoulders. The *pygidium* is feebly rugose, the *metasternum* punctured and clothed with long yellow hairs, except in the middle, which, with the *abdomen*, is smooth and shining. The *sternal process* is extremely slender and curved.

♂. The posterior cephalic process is slender and acutely pointed, and the prothorax tapers towards the front. The abdomen is not channelled beneath.

♀. The posterior cephalic process is **T**-shaped and slender, and the prothorax broad.

Length 22 mm.; *breadth* 11·5 mm.

Assam: Shillong, Khasi Hills.

Type in the British Museum; that of *T. parvus* in the German Entomological National Museum.

In the typical green form the hind femora and the greater part of the front and middle femora are metallic green, but in the blue variety all the femora, as well as the tibiæ, are orange-coloured.

A female of *Heterorrhina tibialis*, Westw., was associated by Adam White with a male of this species in the belief that they were the two sexes of the same insect, and it is that insect which is represented in fig. 2 of the Plate quoted above.

82. **Trigonophorus scintillans**, sp. n.

Bright shining green or golden-green above and beneath, with the tibiæ and the sides of the hind coxæ bright yellow, the femora slightly suffused with metallic green and the tarsi black.

The body is depressed and rather broad. The *clypeus* is strongly granulated in front and the anterior horn entire. The *pronotum* is coriaceous and strongly punctured at the sides, the *scutellum* bears a very few punctures, and the *elytra* are well punctured. The *pygidium* is shining, but granulose and slightly setose, the *metasternum* shining and strongly but not closely punctured at the sides, and the *abdomen* almost smooth. The *sternal process* is long, narrow, and directed a little downwards.

♂. The anterior cephalic process is long and gently dilated and the posterior process acute and moderately long.

♀. The anterior cephalic process is short and rapidly dilated

and the posterior process rectangular and not dilated in front.

Length 27–31 mm.; *breadth* 14–16 mm.

SIKKIM: Mungphu, Darjiling, Karsiang.

Type in the British Museum; cotypes in coll. R. Oberthür.

This is the most brilliant species of the genus. It is very closely

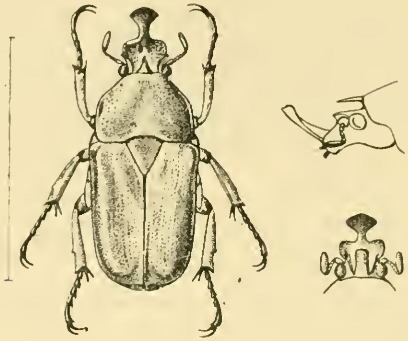

Fig. 24.—*Trigonophorus scintillans*, and head of male (above) from the side, and female (below) from above.

related to *T. nepalensis*, but generally larger and more strongly punctured. The femora have a slight metallic green lustre, and the metasternum is shining. The posterior horn of the female is rectangular instead of hammer-shaped.

83. Trigonophorus feæ.

Trigonophorus feæ, *Gestro,* Ann. Mus. Genova,* (2) x, 1891, p. 841, pl. 2, fig. 5.

Bright green, with the tibiæ and sides of the hind coxæ red and the tarsi black.

♀. The form is rather broad. The *clypeus* is rather short, closely granulated, excavated, with the sides curved and not much elevated; the anterior process is strongly dilated and trisinuate in front and the posterior lobe long, not slender, dilated and straight in front. The *prothorax*, *scutellum* and *elytra* are coriaceous and indistinctly punctured, a few of the punctures upon the elytra forming imperfect rows. The *prothorax* is broad and rather flat, with the hind angles rather prominent and the base very feebly excised before the scutellum. The *pygidium* is finely rugose and setose, and the sides of the body beneath are coriaceous and scarcely punctured. The *sternal process* is very slender, sharply pointed, and nearly straight.

The male is unknown.
Length 25 mm.; *breadth* 13 mm.
Burma: Karen-ni (*L. Fea*), 2700 to 3000 ft.
Type in the Genoa Museum.

84. **Trigonophorus foveiceps.**

Trigonophorus foveiceps, *Gestro*,* *Ann. Mus. Genova*, (2) vi, 1888, p. 114; *op. cit.* (2) x, 1891, p. 842, pl. 2, figs. 7 & 8.

Pea-green and very smooth and shining, with the femora and lower surface rather brighter, and the tibiæ and tarsi black.

♀. The form is rather broad. The *clypeus* is rather short, granulated, not deeply excavated, with the sides parallel and the margins not much elevated; the anterior process is small, moderately dilated and straight in front, and the posterior lobe large, very prominent, oval in shape and slightly concave above. The *prothorax* is broad, strongly angulated before the middle and sinuated behind, with the hind angles rather prominent. The sides are completely margined, the base feebly excised before the scutellum, and the surface coriaceous and feebly punctured at the sides. The *scutellum* is smooth and the *elytra* feebly punctured in incomplete rows. The *pygidium* is coriaceous, the *metasternum* moderately punctured at the sides, and the *abdomen* very smooth. The *sternal process* is slender and strongly curved.

A single female is the only known specimen.
Length 28 mm.; *breadth* 13·5 mm.
Burma: Kachin Hills (*L. Fea*).
Type in the Genoa Museum.

85. **Trigonophorus delesserti.**

Goliathus delesserti, *Guér.*, *Rév. Zool.* 1839, p. 229; *Voy. Delessert*, 1843, p. 42, pl. 12, fig. 2.
Trigonophorus delesserti, *Westw.*, *Arcana Ent.* i, 1842, p. 122, pl. 29, fig. 4.

Olive-green, with the pygidium, legs and lower surface brighter, sometimes golden-green, and the tarsi black. There are frequently indefinite darker patches upon the upper surface and occasionally the whole insect is blue-black, with the head, legs and lower surface a little lighter.

The *head* is rugosely punctured, with a smooth median longitudinal carina, on each side of which there is a row of stiff bristles. The *clypeus* is short and broad, with the angles well marked and the anterior process large, slender at the base, strongly and abruptly dilated, with sharp, recurved lateral angles and sinuate front margin. The *head* is excavated between the eyes and the *forehead* is furnished with a short horizontal lobe, triangular and acutely pointed in both sexes, but scarcely reaching the level of the front of the eyes. The *prothorax* is very transverse, with the sides completely margined and strongly angulated in the middle:

the surface is coriaceous and only visibly punctured at the sides. The *scutellum* is without distinct punctures and the *elytra* are punctured in rather indistinct rows and rugose at the apical margins. The *pygidium* is transversely rugose, the sides of the *metasternum* coarsely punctured, and the *abdomen* almost smooth. The *sternal process* is flattened, curved and blunt.

♂. There is a vestige of a lateral tooth to the front tibia and the abdomen is lightly channelled beneath.

♀. The pygidium is slightly setose.

Length 42 mm.; *breadth* 20 mm.

MADRAS: Nilgiri Hills, Anaimalai Hills.

This beetle sometimes appears in enormous numbers. Mr. H. L. Andrewes has usually found it in Blue Gum trees (*Eucalyptus globulus*) flying about the tops or feeding upon the sap which exudes from the trunks, and he and Mr. Gray have seen the males fiercely fighting together by butting each other with their horns. Mr. Andrewes has more than once picked up detached heads beneath the trees, possibly dropped by birds.

Group 4. *CETONIIDES.*

This is the largest and most typical Group in the Subfamily. The species are generally compactly built and most of them are covered on the upper surface with a dull bloom and decorated with a white or yellow powdery matter. The base of the pronotum has its sides inclined, not in a transverse line as in the previous group, and is excised in front of the scutellum, the posterior angles of the prothorax becoming obtuse and sometimes completely obliterated. The scutellum is generally blunt at its apex and is never very acute, as in the remaining groups of CETONIINI and the CREMASTOCHILINA. The sexes are alike or distinguished only by slight external differences.

Table of the Genera.

1 (2)	Sides of elytra not distinctly sinuated behind the shoulders	ANTHRACOPHORA, [p. 109.
2 (1)	Sides of elytra distinctly sinuated behind the shoulders.	
3 (10)	Pronotum not abruptly emarginate behind.*	
4 (7)	Clypeus toothed at front angles.	
5 (6)	Clypeus strongly depressed at the sides ..	ANATONA, p. 113.
6 (5)	Clypeus flat	POGONOPUS, p. 116.
7 (4)	Clypeus sinuate in front, not angulate.	
8 (9)	Scutellum sharp; tarsi very slender	GYMNOPHANA, [p. 118.
9 (8)	Scutellum blunt; tarsi compact	GLYCYPHANA, [p. 120.
10 (3)	Pronotum abruptly emarginate behind.	
11 (14)	Sternal process laterally compressed.	

* Except in *Glycyphana malayensis*, Guér.

12 (13) Metallic; hind tibia digitate .... CETONIA, p. 132.
13 (12) Not metallic: hind tibia not digitate: sternal process usually vertical .... GLYCOSIA, p. 129.
14 (11) Sternal process broad and flat, or absent.
15 (18) Clypeus not elongate, rather broad in front.
16 (17) First joint of hind tarsus spinose .... ÆTHIESSA, p. 135.
17 (16) First joint of hind tarsus not spinose .... PROTÆTIA, p. 136.
18 (15) Clypeus elongate, narrow in front.
19 (22) Clypeus flat.
20 (21) Clypeus bilobed .... OXYCETONIA, [p. 163.
21 (20) Clypeus entire .... STALAGMOSOMA, [p. 170.
22 (19) Clypeus keeled, with produced angles .... CHILOLOBA, p. 171.

Genus ANTHRACOPHORA.

Anthracophora, *Burm., Handb. Ent.* iii, 1842, p. 633; *Lacord., Gen. Col.* iii, 1856, p. 540.

TYPE, *A. rusticola*, Burm. (China and Japan).

Range. Japan, China, Siam, India, Java.

Form compactly oval, a little depressed, with rather short legs. Head short, the clypeus about twice as broad as it is long, with the front margin reflexed and not distinctly excised. Prothorax rather broad, with the base narrowly excised at the middle. Scutellum rather small, not sharply pointed. Elytra completely covering the abdomen at the sides, very little sinuated behind the shoulders and blunt at the apical angles. Prosternum forming two nodular processes in front of the anterior coxæ. Middle coxæ rather wide apart, the sternum a little produced in front of them, of varied shape but not dilated in front. Tibiæ rather short, the front ones armed with two or three short teeth, the middle and hind ones acutely digitate at the end. Mandibles stout at the base, with the outer lobe thin but moderately chitinised and not long. Maxilla not long, thickly fringed at the extremity, the lower lobe forming a very slender hooked tooth and the outer one a bluntly bidentate process. Mentum broad in front and very obtusely emarginate. Antennæ rather short.

The sexes are alike externally.

Key to the Species.

1 (6) Sternal process conical, very short.
2 (5) Front tibiæ tridentate.
3 (4) Elytra decorated with a lateral pale patch placed behind the middle .... *siamensis*, Kr., [p. 110.
4 (3) Elytra decorated with very small scattered white markings, sometimes absent .... *crucifera*, Oliv., [p. 110.
5 (2) Front tibiæ bidentate .... *bufo*, Arrow, [p. 112.
6 (1) Sternal process semicircular .... *dalmanni*, Hope, [p. 112

86. **Anthracophora siamensis.**

Anthracophora siamensis, *Kraatz,* Deutsche Ent. Zeitschr.* 1894, p. 216.

Black, with the legs and lower surface shining and bearing a few reddish setæ; the upper surface covered with a black or olive-black velvety bloom, with small interspersed bare patches upon the elytra, and decorated with silky pale yellowish markings as follows:—minute indefinite spots upon the vertex of the head and the sides of the pronotum (a row of three being generally distinguishable on each side of the latter), a minute spot in each angle of the scutellum (sometimes indistinguishable), and a large double patch on each elytron, occupying the greater part of the posterior half of the outer margin. There is an indefinite sprinkling of the same colour upon the pygidium, femora and sides of the sternum and abdomen.

The form is rather broadly oval and robust. The *head* is finely rugose, with the front margin entire, broadly rounded at the sides and scarcely reflexed. The *prothorax* is very coarsely punctured (more coarsely at the sides), with the lateral margins bisinuate and the base narrowly excised in the middle. The *scutellum* is moderately long, with the apex moderately pointed, and bears a few large punctures. The *elytra* bear rows of very large horseshoe-shaped impressions, some of which are elongate and contiguous, producing a chain-like appearance. The *pygidium* is rugose, impressed on each side, and setose, the *metasternum* smooth in the middle and very coarsely punctured at the sides, and the *abdomen* very coarsely punctured all over. The *mesosternum* forms a very short and blunt conical process, and the *front tibiæ* are armed with three acute short teeth.

Length 19 mm.; *breadth* 10 mm.

ASSAM: Khasi Hills; SIAM.

Type in the German Entomological National Museum.

87. **Anthracophora crucifera.**

Cetonia crucifera, *Oliv., Ent.* i, 6, 1789, p. 39, pl. 5, fig. 29; *Burm., Handb. Ent.* iii, 1842, p. 624.

Cetonia atromaculata, *F., Ent. Syst.* i, 2, 1792, p. 141; *G. & P., Monogr. Cet.* p. 171, pl. 30, fig. 3.

Var. Anthracophora ceylonensis, *Kraatz,* Deutsche Ent. Zeitschr.* 1895, p. 110.

Black and shining, with a sprinkling of small sooty patches upon the elytra, and decorated with silvery-white markings distributed as follows:—scattered spots on the head, an irregular patch bordering each side of the pronotum, a minute spot in each angle of the scutellum, and an irregular sprinkling at the lateral and apical borders of the elytra (very sparse before the middle and generally including a more or less apparent postmedian

agglomeration). There is a similar sprinkling upon the pygidium, the sides of the metasternum and abdomen, and the middle and hind femora.

The form, size and markings are very variable and the latter are liable to disappear entirely. The *head* is moderately punctured, the clypeal margin being reflexed and very feebly sinuated in front. The *prothorax* is coarsely punctured at the sides, scarcely punctured in the middle, with the lateral margins strongly curved and slightly sinuated before the posterior angles, and the base very feebly and narrowly emarginate in the middle. The *scutellum* is rather short and moderately sharp at the apex. The *elytra* are uniformly striated with irregular lines of coarse punctures and the alternate intervals are distinctly raised. The *pygidium* is coarsely rugose. The *metasternum* and *abdomen* are smooth in the middle and decorated with large crescent-shaped impressions at the sides. The *sternal process* is very bluntly conical, with its anterior face nearly vertical. The *front tibiæ* are armed with three strong acute teeth.

Length 15–21 mm.; *breadth* 8–11 mm.

UNITED PROVINCES: Dehra Dun; BENGAL: Sahibganj, Pusa, Purneah Dist., Berhampur; BOMBAY: Surat; MADRAS: Bangalore; CEYLON.

Type in the Paris Museum; that of *atromaculata* in the Copenhagen Museum.

The var. *ceylonensis* was described from a single example differing from typical specimens only in a few small details which appear to me of no importance; but in case further specimens should prove these to have a greater value than I can at present assign to them, I give the following description from the type specimen kindly lent me by the Berlin Entomological National Museum.

Var. **ceylonensis.**

Black, with the head, legs and lower surface shining and the upper surface and pygidium opaque; decorated with small greyish spots upon the head, pronotum (a lateral and sublateral line of spots on each side), scutellum (a spot in each angle), elytra, pygidium, and the sides of the metasternum and abdomen. The spots are most closely aggregated behind the outer margins and at the apices of the elytra, upon the pygidium and the sides of the body beneath.

The form is as described above, but it is larger; the front margin of the *clypeus* is straight, the sides of the *prothorax* are angulated exactly in the middle and the base is angularly emarginate before the scutellum. There are a few coarse punctures close to the sides. The *scutellum* is rather long and narrow. The *elytra* are coarsely punctured in irregular rows and the alternate intervals are elevated. The *pygidium* is coarsely rugose, the middle of the *metasternum* and *abdomen* sparsely punctured, and the sides decorated with large crescent-shaped impressions. The

sternal process is bluntly conical, and the *front tibiæ* are acutely tridentate.

Length 24 mm.

Ceylon.

Type in the German Entomological National Museum.

88. **Anthracophora bufo.**

Anthracophora bufo, *Arrow*,* *Ann. Mag. Nat. Hist.* (7) xix, 1907, p. 353.

Deep red-brown, irregularly speckled above and below with yellow markings; opaque and velvety, except at the middle of the prothorax, metasternum and abdomen and a strong costa on the anterior half of each elytron.

Fig. 25.
Anthracophora bufo.

The form is ovate and depressed. The *clypeus* is broad, entire and strongly punctured. The *prothorax* is strongly but not closely punctured in the middle, very coarsely and rugosely at the sides, with the lateral margins distinctly angulated at the middle, and strongly sinuated behind. The *scutellum* is rather short, punctured, opaque and variegated. The *elytra* are irregularly punctured and striated, and each has a smooth curved costa on the basal half. The *pygidium* is rugose, and the *metasternum* and *abdomen* are strongly punctured and shining in the middle, but opaque and closely sculptured with crescent-shaped impressions at the sides. The *legs* are very short, opaque, and decorated like the body, and there are two very short teeth on the *front tibia*. The *sternal process* is short but rather sharply conical.

Length 16 mm.; *breadth* 8·5 mm.

Assam: Sylhet.

Type in the British Museum.

89. **Anthracophora dalmanni.**

Cetonia dalmanni, *Hope*,* *Gray's Zool. Miscell.* 1831, p. 24.
Anthracophora bohemani, *Westw.*,* *Trans. Ent. Soc. Lond.* v, 1849, p. 149, pl. 16, fig. 7.

Black, with the clypeus, legs and lower surface shining, the upper surface and pygidium opaque; the elytra decorated with irregular brick-red spots, scattered and inconspicuous in front and confluent behind the middle, where they form a more or less extensive apical patch. The pygidium and the sides of the abdominal segments are partly or entirely of the same colour.

The shape is elongate-oval. The *head* is very finely punctured, with the *clypeus* short, almost straight in front and with a very feebly reflexed margin. The *prothorax* is very coarsely punctured at the sides and has two slight depressions near the front and two more near the base. The sides are strongly angulated near the middle and the base deeply and narrowly emarginate in the middle. The *scutellum* is long and narrow. The *elytra* are coarsely and shallowly punctate-striate and the alternate intervals elevated, especially in the anterior part. The *pygidium* is microscopically rugose, the *metasternum* and *abdomen* smooth in the middle and coarsely rugose at the sides. The *sternal process* is very short, broadly rounded in front, and bears a deep transverse groove. The *front tibia* is armed with three sharp teeth, the terminal one long.

♀. The terminal tooth of the front tibia has a very peculiar thickening beneath and is less acute at the end than that of the male. The last two ventral segments are rather strongly punctured.

Length 18–22 mm.; *breadth* 10–12 mm.

UNITED PROVINCES: Landaur, Naini Tal (Nov.); NEPAL; SIKKIM: Darjiling, Karsiang, 5000 ft. (*Annandale*, June).

Type in the British Museum; that of *bohemani* in the Oxford Museum.

This insect is recorded as being found feeding upon the resinous exudation of oak-trees.

Genus **ANATONA.**

Anatona, *Burm., Handb. Ent.* iii, 1842, p. 503; *Lacord., Gen. Col.* iii, 1856, p. 530.
Eumimela, *Kraatz, Deutsche Ent. Zeitschr.* xxv, 1881, p. 264.

TYPE, *Cetonia stillata*, Newm.

Range. India.

Form shortly oval, compact and convex, slightly pubescent above and beneath. Clypeus attenuated almost to the extremity, where it is rather abruptly dilated, reflexed and nearly straight, the angles being prominent and rounded laterally. Base of the pronotum gently rounded, very feebly excised in the middle; hind angles broadly rounded. Scutellum broad at the base and scarcely longer than its breadth, with the apex angulated. Sides of the elytra sinuated behind the shoulders; the sutural angles sharp but not produced. Middle coxæ rather wide apart and the sternum not produced nor dilated in front; mesosternal part extremely narrow and the suture fringed with hairs. Front tibiæ strongly and rather irregularly tridentate; hind tibiæ truncate.

♂. The abdomen is arched, but not channelled, beneath.

Key to the Species.

1 (4)	Upper surface opaque and spotted.	[p. 114.
2 (3)	Grey, brown or red, with yellow markings.	*stillata*, Newm.,
3 (2)	Black, with white markings	*alboguttata*, Burm., [p. 115.
4 (1)	Upper surface shining, not spotted	*castanoptera*, Burm., [p. 116.

90. Anatona stillata.

Cetonia stillata, *Newm.*,* *Ent. Mag.* v, 1838, p. 169.
Cetonia lignea, *Blanch.*, *Liste Cet. Mus. Paris*, 1842, p. 8.
Anatona flavoguttata, *Burm.*,* *Handb. Ent.* iii, 1842, p. 504; *Redt.*, *Hügel's Kaschmir*, iv, 2, 1848, p. 530, pl. 25, fig. 2.
Anatona pilicollis, *Kraatz*, *Deutsche Ent. Zeitschr.* 1898, p. 223.

Black, with the elytra red or chocolate-coloured and the upper surface, except the head, covered with a greyish or tawny bloom and decorated with yellow markings as follows: a border on each side of the prothorax, and two discoidal and two basal spots; a small spot near the shoulder of each elytron, another near the middle of the inner margin, three small patches adjoining the outer margin, a fourth occupying the apical angle, and a spot a little in front of the last. A patch on each side of the pygidium (sometimes divided into two), the mesosternal epimera, part of the hind femora, and the sides of the metasternum and abdomen are similarly decorated.

The form is short, oval and convex. The *head* is granulated and clothed on the vertex with long tawny hairs. The *pronotum* is rather strongly punctured, with the sides strongly curved, the front angles acute and the hind angles almost obsolete. The base is gently curved and very feebly emarginate before the *scutellum*, which is short and triangular. The *elytra* are coarsely punctate-striate, sinuated behind the shoulders and sharply angular, but not spinose, at the apices. The *pygidium* is finely punctured and sparingly clothed with yellow hairs. The *metasternum* is smooth in the middle and thickly hairy at the sides, and the *abdomen* is sparingly punctured and setose.

♂. The abdomen is a little arched and nearly smooth, and the hind tarsi are rather longer than those of the female.

Length 11–14 mm.; *breadth* 6–8 mm.

PUNJAB: Campbellpur, Kangra Valley (*Dudgeon*), Kulu; CENTRAL INDIA: Mhow; BOMBAY: Kanara, Khandesh (3500 ft.); MADRAS: Bangalore.

Type in the British Museum; that of *lignea* in the Paris Museum; of *flavoguttata* in the Oxford Museum; of *pilicollis* in the German Entomological National Museum.

The wide distribution of this insect is very remarkable. It varies considerably in size and in the colour of the elytra, and in its markings tends to form local races, the typical southern form usually having the spots larger and the thoracic margin broader

and extending beyond the hind angles. In the northern form the latter generally stops at the angle and the discoidal spots are absent.

It is exceedingly abundant during the autumn rains in the districts it inhabits. Mr. T. R. D. Bell records that upon the day following a fall of rain he has found them swarming all over the Khandesh plateau, flying in thousands close to the ground, over the burnt grass, and making a humming noise like a swarm of bees, which they very much resemble on the wing. The females burrow into the ground and apparently deposit their eggs among the grass roots, upon which no doubt the larvæ feed. The beetles are also sometimes found clinging together in clusters, in which the different varieties occur together.

91. Anatona alboguttata.

Anatona alboguttata, *Burm., Handb. Ent.* iii, 1842, p. 504.

Black, with the prothorax, scutellum and elytra opaque, and the head, pygidium, legs and lower surface shining; decorated with the following white markings:—a marginal line on each side of the pronotum, a narrow median line, not reaching the front or hind margin and interrupted behind the middle, and three spots placed in a longitudinal line on each side; the mesosternal epimera and a spot at the apex of the scutellum; from six to eight on each elytron and two on each side of the pygidium (sometimes coalescing). A spot near the extremity of each hind femur and patches at the sides of the sternum, hind coxæ and abdomen are also white.

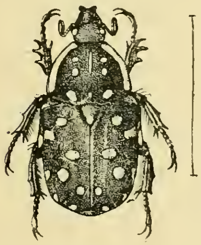

Fig. 26.
Anatona alboguttata.

This species is far larger than the other two. It is of similar form, compact and convex. The *head* is very small, finely granulated, clothed with long yellow hairs on the forehead, with the *clypeus* strongly rounded from side to side, but not carinated, and narrow but a little dilated in front. The *prothorax* has the sides strongly rounded, the hind angles moderately well-marked and the base feebly excised in the middle. The *scutellum* is short, with the sides regularly rounded and the apex blunt. The *elytra* are smooth, very scantily punctured, gently sinuated at the outer edges and rather bluntly angulated at the apices. The *pygidium* is finely rugose and pubescent, the *metasternum* coarsely rugose and pubescent at the sides and smooth in the middle, and the *abdomen* almost smooth. The *front tibia* is armed with three long and sharp teeth not standing far apart.

♂. The abdomen is broadly excavated beneath.

Length 17–20 mm.; *breadth* 9–10·5 mm.

MADRAS: Bangalore; DECCAN (*teste* Burmeister).

92. **Anatona castanoptera.**

Anoplochilus castanopterus, *Burm.*, *Handb. Ent.* iii, 1842, p. 509.
Eumimela pygialis, *Kraatz*,* *Deutsche Ent. Zeitschr.* xxv, 1881, p. 264 (n. syn.).

Shining black above and beneath, with the elytra sometimes reddish chestnut, and thinly clothed with tawny hairs, except upon the scutellum and at the middle of the metasternum and abdomen, the hairs being very short and scanty upon the elytra.

The size and form are the same as those of *A. stillata*. The *head* is granulated and the *prothorax* very strongly and uniformly punctured, with the sides rounded, the hind angles obsolete, and the base broadly emarginate in the middle. The *scutellum* is smooth and marked with a slight longitudinal impression; and the *elytra* are marked with rows of large, shallow and more or less confluent pits; the sides are sinuated and the apical angles fairly well marked. The *pygidium* is rugose, the *metasternum* smooth in the middle and punctured at the sides, and the *ventral segments* have each a median row of punctures and are irregularly punctured at the sides. The teeth of the *front tibia* are strong, the 1st and 3rd sharp and directed obliquely forward, and the 2nd broad and directed slightly backward.

♂. The abdomen is broadly excavated and the hind tibiæ and tarsi have a conspicuous tawny fringe.

Length 12 mm.; *breadth* 7 mm.

Punjab: Kulu; Bombay (*teste* Burmeister).

Type unknown; that of *pygialis* in the German Entomological National Museum; co-type in the British Museum.

Burmeister's type perhaps has the head damaged or abnormal.

Genus **POGONOPUS**, nov.

Type, *Pogonopus pusillus*, sp. n.

Range. India.

Body small, compact and convex. Clypeus flat, narrowed a little to the front, with the anterior angles forming reflexed teeth. Pronotum convex, narrow in front, with the sides regularly curved, the hind angles completely obliterated, and the base gently curved and hardly perceptibly sinuated before the scutellum. Scutellum short, broad at the base and moderately sharp at the apex. Elytra moderately sinuated at the side margins and not sharp at the apical angles. Mesosternum broad and hairy in front and not produced. Legs rather short, front tibia armed with three strong teeth; hind tibia truncate at the end.

♂. Abdomen arched beneath. Hind tarsus bearing a rather long fringe of hairs beneath.

The two interesting little species for which I have formed this genus are both characterised by markings composed of a peculiar silky matter having a pearly-blue lustre which in certain lights may vary from nearly white to nearly black.

Key to the Species.

Pygidium clothed with short erect setæ ; base of pronotum scarcely emarginate in the middle	*pusillus*, sp. n., p. 117.
Pygidium not clothed with setæ ; base of pronotum very gently emarginate in the middle	*argentifer*, Westw., p. 117.

93. Pogonopus pusillus, sp. n.

Shining black, with a slate-grey opaque covering upon the vertex of the head, the pronotum, scutellum and elytra, with two small anterior spots on each side of the pronotum ; the three angles of the scutellum, the posterior half of the elytral suture, the humeral and apical calli and parts of the outer margins, denuded and shining ; decorated with silvery-blue markings forming a lateral border on each side of the pronotum, and upon the posterior half of each elytron an irregular outer border extending to the suture and two small spots near the suture. The pygidium has also a large irregular patch on each side, and the sides of the sternum, a patch on the hind coxa and a marginal row of spots on each side of the abdomen beneath are of the same colour. The head, pygidium and sides of the body beneath are clothed with yellow setæ.

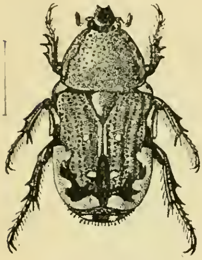

Fig. 27.
Pogonopus pusillus.

It is a very small insect, elongate-oval and convex in shape. The *clypeus* is granulated, with its front angles very sharp. The *pronotum* is distinctly punctured except in the middle and the basal margin is gently curved, with a hardly perceptible sinuation in the middle. The *scutellum* is short but rather sharp at the apex. The *elytra* bear large horseshoe-shaped punctures in irregular double rows, extending from the base nearly to the apex. The *pygidium* is strigose, and the *metasternum* and *abdomen* are very smooth and shining in the middle.

I have seen only a single male specimen, taken by Capt. A. K. W. Downing.

Length 9 mm. ; *breadth* 5 mm.

MADRAS : Podanur, near Coimbatore.

Type in the British Museum.

94. Pogonopus argentifer.

Anoplocheila argentifera, *Westw.*,* *Trans. Ent. Soc. Lond.* v, 1849, p. 148, pl. 16, fig. 6.

Black, with the legs and lower surface shining, and the pronotum, scutellum and elytra opaque ; decorated with the following

glistening pearly-blue markings:—the lateral margins of the pronotum and two median and two basal spots, which frequently fuse with the borders, leaving only a median cross-shaped black mark; the mesosternal epimera and parts of the scutellum; the lateral parts of the elytra (continued round the apical margins but sometimes interrupted), and a median and a subapical spot upon each (sometimes united to the borders). The greater part of the pygidium, the sides of the sternum, a row of minute spots on each side of the abdomen, and a large patch upon each hind femur are also of the same colour.

This is a very small species, elongate-oval and very convex. The *head* is densely granulated, with the sides of the *clypeus* strongly rounded, the front margin reflexed and the front angles rather produced. The *pronotum* is strongly punctured, rather narrow in front, with the posterior angles little indicated and the base regularly curved and very gently emarginate in the middle. The *scutellum* is short and rather blunt, and the *elytra* are strongly punctured in rows, well sinuated at the sides and rather obtuse at the apical angles. The *pygidium* is smooth, finely and sparsely punctured, the sides of the *metasternum* strongly, and those of the *abdomen* slightly, punctured and pubescent. The *mesosternum* is setose, little dilated before the coxæ and not produced, and the *front tibia* is armed with three strong teeth.

♂. The abdomen is broadly channelled and the hind tibiæ and tarsi bear a long but not dense fringe.

♀. All the tarsi are distinctly shorter than in the ♂.

Length 12 mm.; *breadth* 5·5 mm.

Bombay: Poona.

Type in the Oxford Museum.

Genus **GYMNOPHANA**, nov.

Type, *Cetonia oatesi*, Gestro.

Range. That of the type.

Form depressed and not very elongate, with very long and slender legs. Clypeus quadrate, with the front margin broadly excised and not reflexed. Prothorax pear-shaped, narrow in front, with the curvature of the sides regular and continued uninterruptedly round the base, which is scarcely excised in the middle. Scutellum rather long and pointed. Elytra strongly sinuated at the outer margins and spinose at the apical angles. Sternal process very short and transversely dilated.

♂. Legs very slender, the front tibiæ not toothed, the hind tibiæ truncate at the end, and all the tarsi considerably longer than the tibiæ, the middle ones about twice as long.

The female is not yet known.

Although of very distinctive form, this new genus is nearly related to *Glycyphana*, from which it differs in having the pro-

thorax strongly narrowed from behind forwards and scarcely at all emarginate before the scutellum, in the unarmed front tibiæ of the male, and the very long and slender tarsi.

95. Gymnophana oatesi.

Cetonia oatesi, *Gestro,* Ann. Mus. Genova,* (2) x, 1891, p. 848.

Black, with the pronotum, scutellum and elytra opaque, and decorated with white or pale yellow markings as follows:—a border at each side of the pronotum and a pair of minute spots at the middle; an irregular patch beyond the middle of each elytron, adjoining the lateral margin and sending a short process towards the inner margin, and an apical border, slightly dilated at the suture; three irregular spots on each side of the pygidium; the mesosternal epimera; the sides of the sternum, hind coxæ and abdomen, and patches upon the middle and hind femora.

Fig. 28.
Gymnophana oatesi.

The body is slightly depressed, not very elongate and scarcely narrowed behind. The *eyes* are very prominent, the *head* rugose, with the vertex hairy and the *clypeus* rather flat, long and narrow, the sides rather straight, and the anterior edge broadly emarginate and scarcely reflexed. The surface of the *pronotum, scutellum* and *elytra* is very smooth and not perceptibly punctured. The *pronotum* is very narrow in front and rather elevated in the middle, the sides are rather straight in front and strongly, almost semicircularly, rounded behind, the hind angles completely obliterated and the base very feebly emarginate in the middle. The *pygidium* is finely rugose, and the *metasternum* and *abdomen* are very smooth in the middle and thinly clothed with whitish hairs at the sides.

♂. The front tibiæ are rather broad, slightly sinuated at the end externally but scarcely toothed, the middle tibiæ are very short, and all the tarsi, especially those of the front and middle legs, are very long and slender. The apical angles of the elytra are very strongly spinose. The abdomen is arched.

The female is unknown.

Length 12·5 mm.; *breadth* 6·5 mm.

Tenasserim: Thagata, 1200–1500 ft. (*L. Fea*; April).

Type in the Genoa Museum.

Genus GLYCYPHANA.

Glycyphana, *Burm. Handb. Ent.* iii, 1842, p. 345.
Euryomia, *Lacord., Gen. Col.* iii, 1856, p. 525.

Type, *Cetonia horsfieldi*, Hope.

Range. The Oriental Region.

Form elongate and very depressed, not much tapering behind, with the legs rather short. Clypeus bilobed, with the margin not reflexed. Prothorax short, with the hind angles obsolete or very slightly indicated and the base trisinuate, without abrupt emargination (except in *G. malayensis*, Guér.). Scutellum rather long, with the sides curvilinear and the apex very blunt. Front tibiæ tridentate in both sexes. Hind tibiæ strongly spinose at the end. Tarsi generally short and closely articulated. Mesosternum flat, a little dilated before the middle coxæ but scarcely at all produced.

The abdomen is not arched or channelled in the male, but the spurs of the hind tibiæ are more acute in that sex.

Although structurally alike the sexes frequently differ in their coloration, and owing to the significance of these differences having been overlooked they have in several cases been given different names.

Key to the Species.

1 (14)	Elytra not spinose at the apical angles.	
2 (11)	Black species, usually with red and orange or golden markings.	
3 (6)	Elytral markings shining.	
4 (5)	Elytral markings irregular, not continuous.	*horsfieldi*, Hope,
5 (4)	Elytral markings forming a regular transverse band	[p. 121. *aurocincta*, sp. n.,
6 (3)	Elytral markings dull.	[p. 122.
7 (10)	Mesosternal epimera black.	
8 (9)	Elytra decorated with a transverse chain of yellow spots........................	*catena*, sp. n., p. 122.
9 (8)	Each elytron decorated with one yellow spot or two placed obliquely	[p. 123. *binotata*, G. & P.,
10 (7)	Mesosternal epimera yellow	*torquata*, F., p. 124.
11 (2)	Green species, with pale spots.	[p. 124.
12 (13)	Pronotum with a pale lateral line	*nicobarica*, Jans.,
13 (12)	Pronotum without pale lateral line......	*nepalensis*, Kr.,
14 (1)	Elytra spinose at the apical angles.	[p. 125.
15 (20)	Pronotum gently sinuated before the scutellum.	
16 (17)	Each elytron decorated with a longitudinal yellow stripe	*festiva*, F., p. 126.
17 (16)	Elytra decorated with pale spots.	[p. 126.
18 (19)	Median lateral spot of elytron large	*swainsoni*, G. & P.,
19 (18)	All spots of elytra minute	*andamanensis*, Jans.,
20 (15)	Pronotum deeply and abruptly excised before the scutellum	[p. 127. *malayensis*, Guér., [p. 128.

96. **Glycyphana horsfieldi.**

Cetonia horsfieldi, *Hope,* Gray's Zool. Miscell.* 1831, p. 25; *Burm., Handb. Ent.* iii, 1842, p. 346.
Cetonia marginicollis, *G. & P., Monogr. Cet.* 1833, p. 251, pl. 47, fig. 6.
Var. Glyciphana biargentata, *Thomson,* Typi Cetonid.* 1878, p. 26.

Opaque velvety-black above, with the head, legs and lower surface shining and very minutely and thinly setose; the pronotum completely encircled with a deep red marginal band, the pygidium and last ventral segment red and each elytron ornamented with a glistening silvery or golden triangular patch placed just behind the middle, with its base reaching the outer margin. The outer edges of the hind coxæ are of the same colour.

The species is long and narrow in shape. The *head* is rugosely punctured, with the *clypeus* not long, a little narrowed towards the front and deeply notched. The *prothorax* is strongly transverse, moderately and evenly punctured, rather narrow in front, where it is very sloping on each side of the middle, with the sides strongly and evenly curved, the hind angles obsolete and the base very slightly emarginate in the middle. The *scutellum* is long and narrow. The *elytra* are deeply punctate-striate, with the sides strongly sinuated close to the shoulders and the sutural angles not sharp. The *pygidium* is rather flat, opaque, and finely striolated transversely, the *metasternum* is smooth in the middle and coarsely striolated at the sides, and the *abdomen* is coarsely and not closely punctured. The *front tibia* is armed with three sharp teeth.

♂. The front tibiæ are narrower in front with the teeth rather farther apart, and the hind tarsi are a little longer than those of the female.

Length 13–14 mm.; *breadth* 6–6·5 mm.

Nepal; Sikkim: Mungphu; Bhutan: Maria Basti; Burma: Bhamo; Assam: Silhet, Manipur; Bengal: Chota Nagpur; Ceylon: Pundaluoya, Kandy.

Type in the British Museum; that of *biargentata* in coll. R. Oberthür.

G. horsfieldi has been recorded as frequenting the flowers of Hibiscus.

This species seems to occur throughout a large part of the Indian area and, as might be expected, is highly variable, the varieties being to some extent localised. The typical form (from the Himalayas) is small and narrow, with rather small triangular golden elytral patches. The Ceylon form is generally rather larger and broader, with the golden patches rather large. A similar form occurs at Chota Nagpur.

A striking variety, of which the exact locality is not known, has the golden area extending almost to the base and apex of the elytra. This may be called var. *aurulenta.*

In the var. *biargentata* the red markings have disappeared. Its precise habitat is also uncertain.

97. **Glycyphana aurocincta**, sp. n.

Velvety-black, with the clypeus, legs and lower surface shining; the pygidium and the lateral and posterior margins of the pronotum blood-red; the elytra traversed just beyond the middle by a glistening golden band, very narrowly interrupted at the suture, the front edge forming a nearly straight line, the hinder edge strongly concave.

The body is depressed in shape and moderately elongate. The *head* is broad, closely punctured, and deeply notched at the front margin. The *pronotum* is a little wider than it is long, with the lateral and posterior margins continuously curved, the hind angles obsolete and the base very feebly sinuated in front of the scutellum. The *scutellum* is rather pointed. The *elytra* are punctate-striate, strongly sinuated behind the shoulders and not spinose at the apical angles. The *pygidium* is minutely striolated transversely, the *metasternum* coarsely rugose at the sides, and the *abdomen* very coarsely punctured. The *front tibia* is armed with three acute teeth.

I have not seen the male.

Length 12–13 mm.; *breadth* 6·5 mm.

Bhutan: Maria Basti (*L. Durel*).

Type in the British Museum; co-types in coll. R. Oberthür.

M. Oberthür has kindly presented the type to the National Collection.

98. **Glycyphana catena**, sp. n.

Velvety-black, with the clypeus, legs and lower surface shining, the lower surface very minutely and thinly setose; the pygidium (except a central black spot) and the lateral and posterior margins of the pronotum blood-red; the elytra traversed at the middle by a chain of six orange spots, those at the outer edges large, the rest small. The metasternum, hind coxæ, and 2nd, 3rd and 4th ventral segments are decorated with large white patches at the sides.

Fig. 29.
Glycyphana catena.

The body is long, narrow and depressed. The *head* is short, the *clypeus* broadly bilobed and closely punctured. The *prothorax* is transverse, with its anterior part drawn into a sharp point as seen from behind. The lateral and basal margins are strongly and continuously curved, the hind angles obsolete and the base very gently excised before the scutellum. The *scutellum* is very long and narrow; the *elytra* are striated, the sides very deeply sinuated behind the shoulders and the apical angles not spinose. The *pygidium* is minutely punctured, the *metasternum* smooth in the middle and coarsely

rugose at the sides, and the *abdomen* coarsely punctured. The *front tibia* is armed with three acute teeth.

Length 15 mm.; *breadth* 7·5 mm.

SIKKIM: Darjiling; BHUTAN: Maria Basti (*L. Durel.*)

Type in the British Museum; co-types in coll. R. Oberthür and the Indian Museum.

I have seen three specimens (all of them males), one of which has been kindly given to the British Museum by M. René Oberthür.

99. Glycyphana binotata.

Cetonia binotata, *G. & P., Monogr. Cet.* 1833, p. 250, pl. 47, fig. 5.
Glycyphana binotata, *Burm., Handb. Ent.* iii, 1842, p. 347.
Glycyphana torquata, *Mohn.* (nec *Fabr.*), *Arch. für Naturg.* 1871, p. 286; *Gestro, Ann. Mus. Gen.* (2) x, 1891, p. 847.
(♂) Glycyphana albomaculata, *Mohn., l. c.* p. 287.

Black, with the upper surface and pygidium velvety, and the clypeus, legs and lower surface shining, the prothorax encircled with a deep red band, more or less interrupted in the middle of the base. In the ♀ the pygidium has a large patch of the same colour on each side and each elytron has a bright orange-yellow patch placed just behind the middle of the outer margin. In the ♂ the patches on the pygidium are bright yellow and there are two orange spots placed transversely on each elytron, the inner spot a little behind the outer one. The sides of the sternum and abdomen are with or without yellow patches.

The body is long, narrow and very depressed. The *head* is finely and closely punctured, with the *clypeus* broad and bilobed. The *pronotum* is strongly punctured, very transverse, much narrowed in front, where it is sharply elevated in the middle, with the hind angles entirely obliterated and the base gently sinuated. The *scutellum* is long and narrow. The *elytra* are deeply striated and have large irregular punctures at the sides, the outer margins are strongly sinuated behind the shoulders and the apical angles sharp but not spinose. The *metasternum* is transversely strigose, except in the middle, and the *abdomen* coarsely punctured. The *legs* are short and the *tarsi* very closely articulated.

The difference between the sexes has already been described.

Length 16–17 mm.; *breadth* 7–8 mm.

TENASSERIM: Tavoy, Meetan; MALAY PENINSULA; JAVA; BORNEO.

All the Burmese specimens I have seen are females and the description of the male is therefore taken from the specimens collected outside our boundaries. All the Burmese examples differ from other females in the larger size of the yellow elytral patch, and there may therefore be a corresponding difference in males from the same region.

The male of this species has been generally known as *G. torquata*, F., but incorrectly.

100. Glycyphana torquata.

Cetonia torquata, *F.*,* *Syst. Eleut.* ii, 1801, p. 157.
Glycyphana torquata, *Arrow*, *Ann. & Mag. Nat. Hist.* (7) xix, 1907, p. 435.
(♂) Glycyphana subcincta, *Janson*,* *Cist. Ent.* ii, 1881, p. 607.
Glycyphana bimacula, *Kraatz*,* *Deutsche Ent. Zeitschr.* 1894, p. 294.

Black, opaque above, with the front of the head, the legs and the lower surface shining; the pronotum broadly bordered with red, which terminates before reaching the front angles and is slightly interrupted before the scutellum. The male has a large lateral yellow patch upon each elytron just behind the middle, and the female two smaller spots placed transversely, another anteriorly, consisting of two contiguous spots, and one on each side of the pygidium. The mesosternal epimera and the sides of the sternum and abdomen are also yellow.

It is elongate, very depressed, and scarcely narrowed behind. The *head* is closely punctured and strongly notched in front. The *prothorax* is finely punctured and rather broad and transverse, with the sides strongly rounded, the hind angles obsolete and the base gently sinuated. The *scutellum* is long and blunt, with curvilinear sides. The *elytra* are deeply striated, strongly sinuated behind the shoulders, and sharply angular but not spinose at the apical angles. The *pygidium* is finely transversely striated. The *metasternum* is smooth in the middle and coarsely strigose at the sides, and the *abdomen* is moderately punctured.

I have examined three males and two females, in which the markings differ sexually in the striking manner described. The types of *G. subcincta*, Jans., and *G. bimacula*, Kr., are both males and exactly agree. The type of Fabricius is identical with a female in the British Museum.

Type in the Copenhagen Museum; that of *subcincta* in coll. O. E. Janson, and of *bimacula* in the German Entomological National Museum.

Length 17 mm.; *breadth* 8·5 mm.

Andaman Is.

Fabricius was ignorant of the locality from which the specimen he described had come, but the habitat "Java" has since been attached to it, perhaps only from the belief that it was the species described from that island as *Cetonia binotata*, G. & P.

101. Glycyphana nicobarica.

Glycyphana nicobarica, *Janson*, *Cist. Ent.* ii, 1877, p. 144.

Deep green and opaque above, with the head, legs and lower surface olivaceous and shining, and the pygidium brick-red and opaque; decorated with pale yellow markings consisting of two minute spots at the back of the head, a narrow marginal line on each side of the prothorax and a pair of discoidal spots (occasionally with an additional pair anteriorly), the mesosternal

epimera, three discoidal and four marginal spots on each elytron (the 4th occupying the apical angle), two spots at the base and two in the lateral angles of the pygidium (sometimes coalescing), and the entire sides of the sternum and abdomen.

The form is depressed, moderately elongate, parallel-sided and scarcely narrowing behind. The *head* is densely punctured and moderately notched in front. The *pronotum* is sparsely punctured, narrower than the elytra, with the sides strongly converging in front and well rounded behind, the posterior angles obsolete and the base very feebly and broadly emarginate before the *scutellum*. The latter is short, moderately broad at the base and very blunt at the apex. The *elytra* are feebly punctured, strongly sinuated behind the shoulders, and sharply angular but not spinose at the apical angles. The *pygidium* is concentrically striated and the *metasternum* and *abdomen* are strongly punctured except in the middle. The *sternal process* is truncated and very short.

The sexes are alike, but the ♂ is distinguishable by the shorter and sharper spurs of the hind tibiæ.

Length 12–13 mm.; *breadth* 5·5–6 mm.

NICOBAR IS.

Type in coll. O. E. Janson.

Some examples of a closely related Australian species, *G. conspersa*, G. & P., almost exactly resemble this in size, colour and markings, but they are always a little broader and more strongly punctured.

102. Glycyphana nepalensis.

Glycyphana nepalensis, *Kraatz*,* *Deutsche Ent. Zeitschr.* 1894, p. 294.

Glycyphana aspera, *Gestro* (nec *Wallace*), *Ann. Mus. Gen.* (2) x, 1891, p. 847.

Dull olive-green, with the pygidium brick-red, the pronotum and pygidium opaque, the scutellum and elytra moderately shining, and the head, legs and lower surface very shining. There are pale yellow markings consisting of a pair of minute spots behind the eyes, a pair, widely separated, at the middle of the pronotum, and another pair placed closer together in front of the last; and about eight minute spots on each elytron. The sides of the pygidium, sternum and abdomen are also pale yellow.

This is a very small, elongate and depressed species. The *head* is densely punctured and not very strongly emarginate in front. The *pronotum* is strongly punctured all over, narrower than the elytra but distinctly transverse, with all the angles obsolete, the sides strongly curved, and the base gently sinuated. The *scutellum* is long, with curvilinear sides, and very blunt at the apex. The *elytra* are coarsely punctate-striate, with the sides strongly sinuated behind the shoulders, and the apical angles acute. The *pygidium* is concentrically striated, and the *sternum* and *abdomen* are clothed, like the legs, with short yellow setæ, except along the middle line, where they are smooth and shining.

The sexes are alike, but the front tibiæ of the ♂ are a little more slender than those of the ♀.

Length 11 mm.; *breadth* 5·5 mm.

Assam: Manipur (*Doherty*); Burma: Karen-ni (*L. Fea*); Bhutan: Maria Basti.

Type in the German Entomological National Museum.

103. **Glycyphana festiva.**

Cetonia festiva, *F.*,* *Ent. Syst.* i, 2, 1792, p. 147.
Glycyphana festiva, *Burm.*, *Handb. Ent.* iv, 1, 1844, p. 565.
Glycyphana bowringi, *Wallace*,* *Trans. Ent. Soc.* (3) iv, 1868, p. 573, pl. 14, fig. 5 (n. syn.).

Deep olivaceous-green; the elytra with a yellow oblique stripe at the middle of each, extending from the front margin to a little before the hind margin, two short and fine transverse white lines at the posterior part of the outer margin, and a minute white spot in the apical angle; the prothorax with white patches or lines upon the front angles beneath. The mesosternal epimera and the sides of the metasternum, hind coxæ and abdomen are also white. The upper surface is opaque and the head, legs and lower surface are shining. The latter parts are sometimes black and the lateral and apical margins of the elytra are frequently coloured deep chocolate. The margin of the pronotum is sometimes vaguely reddish.

The form is depressed, moderately elongate and slightly narrowing behind. The *head* is densely punctured and deeply notched in front. The *pronotum* is coarsely punctured, with the sides strongly curved, the hind angles rounded off and the base trisinuate. The *scutellum* is short and blunt, and the *elytra* are distinctly punctured in rows, strongly sinuated at the sides and very spinose at the apical angles. The *pygidium* is coarsely rugose, and the sides of the *metasternum* and the *abdomen* are coarsely punctured. The *front tibia* bears two very sharp teeth and the third is distant and almost obsolete.

♀. The front tibia is a little broader than in the male.

The type-specimen of Fabricius has a white patch on each side of the pygidium, but this is most often absent.

Length 13 mm.; *breadth* 6·5 mm.

Tenasserim: Siam; Malay Peninsula; Borneo.

Type in the Copenhagen University Museum; that of *bowringi* in the British Museum.

104. **Glycyphana swainsoni.**

Cetonia swainsoni, *G. & P.*,* *Monogr. Cet.* 1833, p. 249, pl. 47, fig. 4; *Schaum, Ann. Soc. Ent. Fr.* 1844, p. 370.

Black, with the prothorax, scutellum and elytra (and the pygidium of the ♂) opaque; the pronotum generally with a blood-red patch, sometimes confined to each posterior angle and sometimes overspreading the whole upper surface except a triangular

area in front of the scutellum. There are also white or pale yellow markings consisting of a pair of minute spots at the middle of the pronotum and a second anterior pair (one or both pairs frequently absent), a transverse patch beyond the middle of each elytron, adjoining the outer margin, and three minute spots anterior and three posterior to this patch (some of them frequently absent). In the ♂ the sides of the pygidium and those of the sternum and abdomen are broadly bordered with the same colour. In the ♀ the pygidium is black and shining, and the sides of the abdomen are only partially decorated with white.

The body is depressed and moderately elongate, and the upper surface is studded with extremely minute setæ. The *head* is finely and closely punctured, and the front margin moderately deeply notched in the middle. The *prothorax* is very short and transverse, finely and fairly closely punctured above, with the hind angles rounded off and the base sinuated. The *scutellum* is short and very blunt. The *elytra* are strongly punctate-striate, with the apical part rugose, the lateral margins strongly sinuated behind the shoulders, the apical margins finely serrated and the apical angles spinose. The *pygidium* is transversely strigose, the *metasternum* and *abdomen* are sparingly punctured in the middle and rugosely at the sides, and the *sternal process* is very short and broad. The uppermost tooth of the *front tibia* is rather feeble.

The sexual difference in the coloration of the pygidium and abdomen has been described above.

Length 12–14·5 mm.; *breadth* 5–7 mm.

Assam: Khasi Hills; Burma: Karen Hills; Tenasserim: Tavoy (Ahsown).

Type in the Oxford Museum.

105. Glycyphana andamanensis.

Glycyphana andamanensis, *Janson, Cist. Ent.* ii, 1877, p. 143; *Kraatz, Deutsche Ent. Zeitschr.* 1885, p. 15.
(♀) Euryomia andamana, *Thoms., Typi Cetonid.* 1878, p. 24.

Dark green, olive, or (in the ♀) black, opaque above, with the head, legs and lower surface shining castaneous or blackish; decorated with whitish markings, consisting of a longitudinal line on each side of the forehead, a narrow lateral line on each side of the pronotum and four small discoidal spots (a pair near the middle placed rather wide apart and an anterior pair placed nearer together), a minute spot at each anterior angle of the scutellum, and about eight irregular spots upon each elytron. There are also six spots upon the pygidium, more or less coalescing into an encircling line, and a series at the sides of the sternum, hind coxæ, and abdomen, the latter very small in the ♀, but forming a continuous broad band in the ♂.

The shape is moderately elongate and depressed. The *head* is closely and evenly punctured, except upon the vertex, and rather deeply notched at the front margin. The *pronotum* is strongly

punctured, considerably narrower than the elytra, with the sides converging strongly in front, almost parallel behind, the hind angles rounded off, and the base gently emarginate in the middle. The *scutellum* is rather narrow and very blunt at the apex. The *elytra* are rather coarsely punctate-striate, very strongly sinuated behind the shoulders, and acutely spinose at the apical angles. The *pygidium* is concentrically strigose and slightly keeled longitudinally, the *metasternum* smooth in the middle and coarsely punctured at the sides, and the *abdomen* very sparsely punctured. The *sternal process* is very short and truncate.

The ♂ is olive-green or brown above, with the lower surface green and broadly bordered with yellow. The ♀ is entirely black, with small yellowish spots only at the sides of the abdomen beneath.

Length 13–14 mm.; *breadth* 6·7–7 mm.

ANDAMAN Is.

Type in coll. O. E. Janson; that of *andamana* in coll. Oberthür.

106. Glycyphana malayensis.

Cetonia malayensis, *Guér.*, *Rev. Zool.* 1840, p. 81.
Glycyphana malayana, *Schaum*, *Ann. Soc. Ent. Fr.* 1844, p. 373.

Deep red, chocolate, olive-green, or indigo, with the head, legs, pygidium and lower surface, and the lateral and apical margins of the elytra, black, and decorated with white as follows:—a spot on each mesosternal epimeron, four placed at equal distances along the outer margin of each elytron, one in the apical angle, and one a short distance before it, a large patch on each side of the pygidium, a row at the sides of the body beneath and an inner row upon the metasternum and the basal segments of the abdomen. There is sometimes a minute spot at each front angle of the pronotum and occasionally another near each hind angle.

The body is rather broad and flat, not narrowing behind, opaque above and shining beneath. The *head* is densely punctured and the *clypeus* deeply notched in front. The *prothorax* is strongly, but not closely, punctured, except near the sides, the lateral margins are angulated in the middle, the hind angles indicated, the base wide and deeply and abruptly emarginate in the middle. The *scutellum* is moderately long and blunt. The *elytra* are irregularly punctate-striate, except at the sides and apices, which are very coarsely and irregularly punctured. They are strongly sinuated behind the shoulders and acutely spinose at the apical angles. The *pygidium* is rugose and clothed with yellowish setæ, and the sides of the *metasternum* and *abdomen* are coarsely rugose. The *sternal process* is prominent and nearly circular. The *front tibiæ* are rather stout and strongly and sharply bidentate.

The two sexes are almost alike, but the teeth of the front tibiæ are a very little more acute in the ♂.

Length 17–20 mm.; *breadth* 8·5–10 mm.

BURMA: Karen Hills; MALAY PENINSULA; SUMATRA; BORNEO.

Genus GLYCOSIA.

Glycosia, *Schoch, Ent. Nachr.* 1896, p. 86.

TYPE, *Cetonia tricolor*, Oliv.

Range. India and the Malayan Region.

Form flattened, rather broad at the shoulders. Head rather small, with the clypeus bilobed and not reflexed at the margin. Prothorax short, narrow in front and broad at the base, with the hind angles well marked, and the base narrowly and abruptly emarginate in the middle. Scutellum small, not very blunt at the apex. Elytra strongly sinuated behind the shoulders. Sternal process prominent, rather compressed and generally directed obliquely downwards. Legs moderately slender, the front tibia armed with three acute teeth and the hind tibia not digitate at the extremity.

♂. The prothorax is broader at the base than in the other sex, and the spurs of the hind tibiæ are more slender and acute.

Key to the Species.

1 (4)	Sternal process vertical in front.	
2 (3)	Pronotum opaque, with red margin ..	*tricolor*, Oliv., p. 129.
3 (2)	Pronotum shining, black	*biplagiata*, Arrow, p. 130.
4 (1)	Sternal process produced forwards ..	*luctifera*, Fairm., p. 131.

107. Glycosia tricolor.

Cetonia tricolor, *Oliv., Ent.* i, 6, 1789, p. 88, pl. 12, fig. 116; *G. & P., Monogr. Cet.* 1833, p. 245, pl. 46, fig. 4.
Glycyphana tricolor, *Burm., Handb. Ent.* iii, 1842, p. 346.
Glycosia plagiata, *Schoch, Ent. Nachr.* 1896, p. 86; *Kraatz, Deutsche Ent. Zeitschr.* 1896, p. 376.

Black, with the head, legs and lower surface shining, and the prothorax, scutellum, elytra and pygidium opaque; the pygidium, mesosternal epimera and lateral margins of the pronotum (sometimes also the hind margin, except in the middle) blood-red; each elytron decorated near the middle with a large pale yellow patch, irregularly triangular in shape, the base resting upon the outer margin and the apex bent obliquely backwards and nearly reaching the inner margin. There is sometimes a line of white spots on each side of the abdomen beneath.

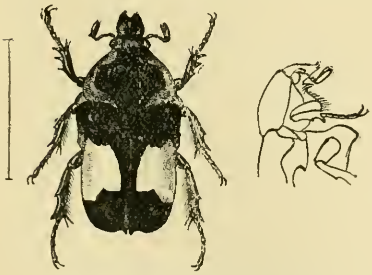

Fig. 30.—*Glycosia tricolor*, and diagrammatic lateral view.

The form is very depressed, with the sides of the elytra rather straight and narrowing slightly to the extremity. The *head* is strongly

punctured, except in the middle, which is a little elevated, and the *clypeus* is strongly bilobed. The *pronotum* is coarsely and deeply punctured, the sides strongly margined, the hind angles prominent and the base narrowly but strongly emarginate in the middle. The *scutellum* is small and not very blunt at the apex. The *elytra* are striate-punctate, with the sides very strongly sinuated behind the shoulders and the posterior margins a little excised near the apical angles, which are acute. The *pygidium* is slightly pitted, the sides of the metasternum are coarsely strigose, and those of the *abdomen* sparingly punctured. The sternal process is vertical in front and the point directed downwards.

♂. The front tibiæ and the hind tarsi are a little more slender and the prothorax broader at the base.

Length 17–19 mm.; *breadth* 9–10 mm.

SIKKIM: Rhenok (*Bretandeau*); BENGAL: Barrackpur, Chota Nagpur; CEYLON: Wellawaya (*Mitschke*).

Var. **nagpurensis**, nov.

A series of specimens in M. René Oberthür's collection, and taken by M. R. P. Cardon during 1896 and 1897 at Nowatoli and Palkot, in Chota Nagpur, belong to a well-marked variety, in which the pale elytral patch is greatly enlarged, being fully half as long as the elytron, and presenting a rounded lobe in front and two similarly rounded lobes behind.

Type in the British Museum; cotypes in coll. R. Oberthür.

108. **Glycosia biplagiata.**

Glycosia biplagiata, *Arrow*,* *Ann. & Mag. Nat. Hist.* (7) xix, 1907, p. 351.

Shining black, with the elytra opaque and sooty, except at the inner margins, and with a lemon-yellow patch beyond the middle of each, broad at the outer margin and pointed at its inner extremity.

The form is depressed, broad at the shoulders, with the head small, and the elytra straight at the sides and strongly narrowing towards the extremity. The *head* is strongly punctured, with the *clypeus* long, narrowing towards the front, where it is rather deeply notched. The *prothorax* is convex, coarsely punctured, with the sides strongly margined and angulated in the middle. The *scutellum* is rather small, pointed, and impunctate. The *elytra* are coarsely striate-punctate, with the margins strongly sinuated behind the shoulders and minutely excised at the extremities, and the apical angles acute. The *pygidium* is feebly punctured and the *metasternum* and *abdomen* coarsely so, except at the middle. The sternal process is vertical in front and the point directed downwards. The *front tibiæ* are tridentate in the female, but the uppermost tooth is almost obsolete in the male. In the latter the prothorax is broader at the base and the apical angles of the elytra are strongly spinose.

Length 20 mm.; *breadth* 10·5 mm.

ANDAMAN IS.; (?) BURMA: Rangoon.

Type in the British Museum.

A specimen in the Indian Museum is labelled ' Rangoon," but perhaps incorrectly.

109. Glycosia luctifera.

Glycyphana luctifera, *Fairm.*,* *Ann. Soc. Ent. France*, 1878, p. 107, pl. 3, fig. 7.

Glycosia louisæ, *Fairm.*,* *Bull. Soc. Ent. France*, 1888, p. 35.

Velvety-black, with the head, legs, and lower surface shining black, the femora and tibiæ fringed with long golden hairs and the lower surface very thinly clothed with setæ. The lateral margins of the prothorax, the mesosternal epimera and two spots upon the pygidium are deep blood-red, and there are markings of white or pale yellow, subject to great reduction, but consisting typically of two spots on the vertex of the head, a circle of from eight to twelve upon the pronotum, two or three in each posterior angle, a longitudinal median line continued upon the scutellum, a lateral patch beyond the middle of each elytron, with a minute spot close to its inner edge, three spots in a triangle at the apex of each and an irregular swarm of minute spots extending to the shoulder. There are also two or four pale spots placed transversely upon the pygidium and two rows on each side of the body beneath.

The body is depressed, rather elongate, and only slightly narrowed behind. The *clypeus* is strongly punctured and rather deeply notched in front. The *pronotum* is short, much narrowed in front, broad at the base and deeply and narrowly emarginate before the scutellum. The *elytra* are punctate-striate, deeply sinuated behind the shoulders and spinose at the apical angles. The *pygidium* is a little punctured, the *metasternum* rugose, and the *abdomen* almost smooth. The *sternal process* is rounded and prominent and directed obliquely forward. The *front tibia* is armed with three sharp teeth.

♂. The uppermost tooth of the front tibia is minute and distant from the other two, the hind tibia bears a thick fringe at the inner edge and the spurs are sharp-pointed.

Length 19–23 mm.; *breadth* 10–12·5 mm.

BHUTAN; SIKKIM: Karsiang; W. CHINA: Yunnan, Su-Tchuen, Tsekou.

Type in coll. R. Oberthür; also that of *louisæ*.

In the type form from Central China the red markings described above are absent. The var. *louisæ* possesses both these and the pale marks enumerated. In the only two Indian examples I have seen the red markings are present, but the white pattern is restricted on the upper surface to the posterior half of the elytra.

Genus CETONIA.

Cetonia, *Fab.*, *Syst. Ent.* i, 1775, p. 52; *Reitter*, *Deutsche Ent. Zeitschr.* 1891, p. 51.
Cetonia, *subgenus* Cetonia, *Mulsant*, *Col. de France*, *Lamell.* 1871, p. 669.
Eucetonia, *Schoch*, *Mitth. Schweiz. Ent. Ges.* ix, 1894, p. 211.

Type, *Scarabœus auratus*, L. (the Rose-beetle of Great Britain).
Range. Europe and Continental Asia.

Clypeus bilobed, not reflexed in front. Head with two pits between the eyes, separated by a narrow carina. Prothorax rather triangular, strongly excised before the scutellum. Scutellum rather narrow, blunt at the apex. Lateral margins of the elytra strongly sinuated and apical angles sharp. Pygidium granulated. Sternal process moderately long, slightly compressed, blunt, and directed a little downwards. Front tibiæ tridentate; middle and hind tibiæ fringed along the inner edge, the middle ones armed with a strong tooth at the outer edge, the hind ones bluntly digitated at the extremity.

♂. Spur of the hind tibia slight and sharp.

♀. Inner spur of the hind tibia stout and broadly truncate. Last ventral segment more closely punctured than in the ♂.

Key to the Species.

1 (4) Ventral segments not spotted at the posterior angles.	
2 (3) Pronotum decorated with two white lines.	*bensoni*, Westw., p. 132.
3 (2) Pronotum without white lines	*rutilans*, Jans., p. 133.
4 (1) Four anterior ventral segments with lateral white spots.	
5 (6) Anterior ventral segments almost smooth.	*lævirentris*, sp. n., p. 134.
6 (5) Anterior ventral segments with numerous crescentic impressions	*rhododendri*, Gestro, [p. 134.

110. Cetonia bensoni.

Protætia bensoni, *Westw.*,* *Trans. Ent. Soc. Lond.* vol. v, 1849, p. 145, pl. 16, fig. 3.

Bright coppery or golden-green, with the pronotum, scutellum and elytra deep green and opaque, and the head, legs and lower surface shining; decorated with whitish markings, consisting of an oblique line on each side of the pronotum, not reaching the front or hind margin and sometimes interrupted; a broken transverse line upon each elytron adjoining the outer margin considerably behind the middle, another behind the last, adjoining the inner margin, a spot near the apical angle and a few others scattered irregularly; a small spot near each lateral angle of the pygidium, and an inconspicuous line of spots along each side of the abdomen beneath.

The body is depressed, broader than the other species of this genus, and not perceptibly narrowed towards the extremity. The surface, except in worn specimens, is clothed above and below with yellow hairs or setæ, short upon the upper surface and absent from the middle of the pronotum, metasternum and abdomen. The *head* is strongly punctured and deeply notched at the front margin. The *pronotum* is very coarsely punctured and its sides gently curved. The *scutellum* is long and unpunctured. The *elytra* have each two well-marked costæ; they are strongly punctured between and outside these, and rugose at the sides and apices. The sides are strongly sinuated behind the shoulders and do not converge towards the extremities, which are broad, with the sutural angles slightly spinose. The *pygidium* is finely granulated, the *metasternum* rugose at the sides, and the *abdomen* strongly punctured except in the middle. The two terminal teeth of the *front tibia* are very sharp and slender.

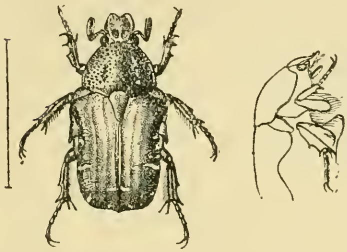

Fig. 31.—*Cetonia bensoni*, and lateral view showing the mesosternal process.

Length 19–21 mm.; *breadth* 10–12 mm.

PUNJAB: Campbellpur; UNITED PROVINCES: Naini Tal, Landaur (May and June).

Type in the Oxford Museum.

The original discoverer, Benson, reported that this species "appears late in the season and frequents the flowers of Syngenesious plants."

111. Cetonia rutilans.

Glycyphana rutilans, *Janson*,* *Cist. Ent.* ii, 1881, p. 607.

Coppery-red, with the pronotum, scutellum and elytra opaque green, and the head, legs and lower surface shining and clothed with yellow hairs; decorated with a pair of minute white spots placed transversely at the middle of the pronotum, a transverse white line adjoining the outer margin of each elytron considerably behind the middle and another posterior to it adjoining the inner margin, with sometimes a few inconspicuous scattered spots anteriorly, and a minute spot near each lateral angle of the pygidium. The lower surface is immaculate.

Moderately depressed in shape and not much narrowed behind. The *clypeus* is strongly punctured, broadly emarginate in front and not narrowed. The *pronotum* is strongly but sparingly punctured, with the sides strongly margined, contracted in front and rather feebly angulated in the middle. The *scutellum* is long and

narrow. The *elytra* are strongly punctured, distinctly bicostate on the disc, and rugosely punctured at the sides and apex. The sides are strongly sinuated behind the shoulders and the apical angles are slightly spinose. The *pygidium* is very finely granulated and hairy, the *metasternum* corrugated and hairy, except along the middle line, and each segment of the *abdomen* (except the last) has a transverse line of punctures along the middle, very strong and confluent laterally.

The abdomen is slightly hollowed in the ♂, and the inner spur of the hind tibia is very blunt in the ♀.

Length 17–21 mm.; *breadth* 9–10 mm.

NEPAL; SIKKIM: Darjiling, Karsiang.

Type in coll. O. E. Janson.

112. Cetonia læviventris, sp. n.

Metallic green, with the pronotum, scutellum, elytra and pygidium opaque, and the head, legs and lower surface shining and clothed with yellow hairs. There is a minute whitish spot on each side of the disc of the prothorax, a transverse lateral line considerably behind the middle of each elytron, an interior one behind it, a spot near the apical angle, four spots in a transverse line upon the pygidium, and a short white line at the hind angle of each of the four anterior ventral segments.

The shape is very elongate and depressed. The *head* is strongly punctured and the *clypeus* broadly notched. The *pronotum* is very transverse, sparingly punctured, with the sides gently rounded and the base strongly sinuated on each side. The *elytra* are moderately punctured, feebly bicostate behind, rugose at the sides and apices and strongly sinuated behind the shoulders. The *pygidium* is rather coarsely granulated, the *metasternum* rugose and hairy at the sides, and the *abdomen* almost smooth.

Length 20–22 mm.; *breadth* 11–12 mm.

ASSAM: Manipur, Naga Hills (*W. Doherty*).

Type in the British Museum.

This species very closely resembles *C. rutilans*, Jans., from which it is most easily distinguished by its almost unpunctured abdomen and the four white spots or lines on each side. It is also larger, the prothorax is less elongate, and the pygidium more coarsely granulated.

113. Cetonia rhododendri.

Cetonia rhododendri, *Gestro*,* *Ann. Mus. Genova*, (2) x, 1891, p. 847.

Cetonia purpurascens, *Kraatz, Deutsche Ent. Zeitschr.* 1897, p. 405.

Eucetonia assamica, *Schoch, Mitth. Schweiz. Ent. Ges.* x, 1898, p. 181.

Coppery-red, with the pronotum, scutellum and elytra deep chocolate, velvety and opaque, and the head, legs and lower

surface shining and more or less clothed with yellow hairs; decorated with very minute whitish spots as follows:—a pair placed transversely at the middle of the pronotum and a second pair closer together in front; a spot at the extreme apex of the scutellum; about nine on each elytron, four along the base of the pygidium, and one in each hind angle of the four anterior ventral segments.

The body is rather narrow and distinctly tapers behind. The *clypeus* is strongly and closely punctured, slightly narrowed in front and moderately notched at the apex. The *prothorax* is distinctly, but not closely, punctured on the disc and more rugosely at the sides, which are gently curved, without a distinct angulation. The *scutellum* is unpunctured and not very long. The *elytra* are rather strongly punctured, with the apical part rugose and with two distinct costæ on the disc of each. The lateral margins are strongly sinuated and the apical angles slightly spinose. The *pygidium* is finely granulated, the *metasternum* closely punctured and hairy, except along the middle line, and the *abdomen* strongly but sparingly punctured.

♀. The last ventral segment is closely punctured and the inner spur of the hind tibia squarely truncated.

Length 16–19 mm.; *breadth* 9–11 mm.

United Provinces: Almora; Sikkim: Karsiang; Assam: Jaintia Hills, Khasi Hills; Burma: Shan States, Mt. Mulaiyit; Siam.

Type in the Genoa Museum; that of *assamica* in coll. Witte (Düsseldorf).

The first described specimen was found upon Rhododendron flowers in Burma by Leonardo Fea.

Genus ÆTHIESSA.

Æthiessa, *Burmeister*, *Handb. Ent.* iii, 1842, p. 405.

Type, *Cetonia feralis*, Erichs. (Algeria).

Range. The Palæarctic Region.

Form compact and moderately elongate. Clypeus transverse, reflexed in front and scarcely notched. Prothorax narrow in front, with the base inclined at the sides and abruptly emarginate in the middle. Scutellum moderately long, bluntly rounded at the apex. Elytra sinuated at the sides and acute at the apical angles. Propygidium projecting at an angle in the middle. Sternal process very short, flat and dilated in front of the middle coxæ. Front tibia armed with three teeth; middle tibia sharply spinose at the extremity; hind tibia not spinose. Tarsi moderately slender, the basal joint in the hind pair short and produced externally into a sharp spine.

♂. Abdomen excavated beneath. Tarsi longer and stouter.

The only species which appears to extend into our region is the following:—

114. **Æthiessa bagdadensis.**

Æthiessa bagdadensis, *Burm.*, *Handb. Ent.* iii, 1842, p. 414.
Æthiessa rugipennis, *Burm.*, *l. c.* p. 417.
Cetonia squamosa, *Fald.* (nec *G. & P.*), *Nouv. Mém. Soc. Imp. Moscou*, iv, 1835, p. 301, pl. 10, fig. 7.

Steel-blue, shining, with slight white marks, forming traces (sometimes absent) of three transverse bars beyond the middle of the elytra, a spot on each side of the pygidium, and a narrow line on each side of the posterior margin of each of the first four abdominal segments.

The body is moderately elongate. The *clypeus* is rather long and rugosely punctured. The *pronotum* is strongly and rather evenly punctured, with the sides gently bisinuated and the hind angles moderately sharp. The *scutellum* is smooth, and the *elytra* are coarsely wrinkled transversely and irregularly pitted with very large annular punctures; there is a broad depression at the inner posterior half of each elytron. The *propygidium* and *pygidium* are finely transversely strigose, the *metasternum* coarsely punctured in the middle, rugose at the sides and thinly setose, and the *abdomen* nearly smooth.

♂. The uppermost tooth of the front tibia is distant from the other two and very feeble, the abdomen is strongly arched and excavated, and the last ventral segment, like the rest, almost smooth.

♀. The clypeus is more rugose, the last ventral segment closely punctured, and the pygidium impressed on each side.

Length 15–18 mm.; *breadth* 8·5–9·5 mm.

BALUCHISTAN: Nushki District; AFGHANISTAN; PERSIA.

Genus **PROTÆTIA.**

Protætia, *Burmeister*, *Handb. Ent.* iii, 1842, p. 472.
Cetonia, *subg.* Protætia, *Lacordaire*, *Gen. des Coléopt.* iii, 1856, p. 536.
Cetonia, *subg.* Potosia, *Muls.*, *Col. de France*, 1871, p. 669.—Type, *Cetonia speciosissima*, Scop.
Oxyperas, *Thoms.*, *Le Naturaliste*, 1880, p. 278.—Type, *Cetonia spectabilis*, Schaum.
Eumimimetica, *Kraatz*, *Deutsche Ent. Zeitschr.* 1881, p. 264.—Type, *Cetonia* (*Anoplochilus*) *terrosa*, G. & P.
Pseudanthracophora, *Kraatz*, *Deutsche Ent. Zeitschr.* 1898, p. 407.—Type, *Cetonia striatipennis*, Kr. (= *C. terrosa*, G. & P.).
Pseudaplasta, *Kraatz*, *l. c.* p. 93.—Type, *P. cinerea*, Kr.
Eucetonia, *Kraatz* (nec *Schoch*).
Pseudanatona, *Kraatz*, *Deutsche Ent. Zeitschr.* 1895, p. 112.—Type, *Cetonia cupripes*, Wied.

TYPE, *Cetonia spectabilis*, Schaum (Sumatra).

Range. Europe, Asia, Africa and Australia.

Form compact, with the legs generally robust. Clypeus simple, more or less reflexed at the front margin and not, or very slightly,

emarginate. Prothorax with the base inclined on each side and abruptly emarginate in the middle. Scutellum moderately long, with the apex blunt and rounded. Elytra sinuated laterally behind the shoulders, with the apical angles acute, frequently spinose. Front tibia armed with two or three short teeth, except in the ♂ of *P. alboguttata*. Hind tibia truncated at the end. Sternal process short and flattened, widened in front of the middle coxæ and straight or broadly rounded in front, except in *P. confusa*.

Except in *P. alboguttata*, the sexes are closely similar and the abdomen is rarely excavated or arched in the male. The spurs of the hind tibiæ, however, are always shorter and sharper in that sex, and the last ventral segment is smoother. In some of the species the anterior edge of the clypeus bears two recurved teeth which are feebler or quite absent in the female.

This is a very large and polymorphic genus, which may be regarded as the central mass of the subfamily from which other genera diverge in all directions. Such a mass is found in nearly every large group and the difficulty of fixing its limits is invariably very great. Tentative efforts to divide it into smaller genera are often made, but are generally doomed to failure as the number of known species increases. In the present case numerous so-called genera have been formed for single species, or upon the strength of features peculiar to one sex, and I have found it necessary to abandon several of these which have failed to stand the test of tabulation.

In the key which follows, one species, *P. alboguttata*, Vigors, is omitted, because it is difficult to find any features, except colour and marking, which are common to the two sexes and which would not be liable to mislead if used for the purpose of tabulation. Such marked dimorphism is entirely abnormal in the present genus, and it would be desirable to form a new genus or subgenus for this species but that the female presents no really distinctive characters, and indeed is very similar to *P. longipennis*, etc.

Key to the Species.

1	(16)	Surface of the body without opaque bloom.	
2	(15)	Surface of the body metallic.	
3	(10)	Thorax (and generally the whole body) without pale markings.	
4	(5)	Surface not very shining	*cuprea*, F., p. 139.
5	(4)	Surface very shining.	
6	(7)	Legs green or blue	*pretiosa*, Nonf., p. 141.
7	(6)	Legs fiery red.	
8	(9)	Elytra without transverse pale markings.	*auripes*, Hope, p. 141.
9	(8)	Elytra decorated with transverse pale markings	*montana*, Nonf., p. 142.
10	(3)	Thorax decorated with pale markings.	[p. 143.
11	(12)	Thorax decorated with minute spots ..	*orientalis*, G. & P.,
12	(11)	Thorax decorated with irregular patches.	

13 (14)	Colour bronze	*aurichalcea*, F., p. 143.
14 (13)	Colour blue-black	*peregrina*, Herbst, [p. 144.
15 (2)	Surface of the body dark blue, not metallic	*impavida*, Jans., p. 145.
16 (1)	Upper surface partly or entirely covered with an opaque bloom.	
17 (56)	Mesonotum transverse before the coxæ.	
18 (37)	Upper surface decorated with definite spots or not at all.	
19 (30)	Front tibia tridentate externally.	
20 (25)	Surface of body metallic.	
21 (24)	Body elongate.	
22 (23)	Prothorax very transverse	*longipennis*, sp. n., [p. 146.
23 (22)	Prothorax not distinctly transverse	*caudata*, sp. n., p. 147.
24 (21)	Body short and massive	*prunina*, sp. n., p. 147.
25 (20)	Surface of body not metallic.	
26 (29)	Large, depressed and decorated with large spots.	
27 (28)	Elytral spots not confined to outer margins..........................	*andamanarum*, Jans., [p. 148.
28 (27)	Elytral spots confined to outer margins.	*whitehousei*, Schaum, [p. 148.
29 (26)	Small, convex, and decorated with minute spots......................	*cinerea*, Kr., p. 149.
30 (19)	Front tibia bi- or uni-dentate externally.	
31 (32)	Sides of pronotum white-bordered	*cupripes*, Wied., p. 150.
32 (31)	Sides of pronotum not bordered.	
33 (36)	Clypeus not notched in front.	
34 (35)	Upper surface without pale markings ..	*inanis*, Wall., p. 151.
35 (34)	Upper surface decorated with large yellow spots	*regalis*, Blanch., p. 152.
36 (33)	Clypeus deeply notched in front	*bidentipes*, Arrow, [p. 153.
37 (18)	Upper surface decorated with an indefinite grey or yellow tracery.	
38 (45)	Apical angles of elytra spinose.	
39 (42)	Upper surface entirely opaque.	
40 (41)	Scutellum rather long and pointed	*rana*, sp. n., p. 153.
41 (40)	Scutellum very short and blunt	*fusca*, Herbst, p. 154.
42 (39)	Upper surface partly shining.	
43 (44)	Front tibia tridentate	*acuminata*, F., p. 155.
44 (43)	Front tibia bidentate	*binghami*, sp. n., p. 156.
45 (38)	Apical angles of elytra not spinose.	
46 (51)	Mesosternal process setose.	
47 (48)	Surface of body black................	*terrosa*, G. & P., p. 157.
48 (47)	Surface of body metallic.	
49 (50)	Body bronzy, clothed with fine close hair	*cœnosa*, Westw., p. 158.
50 (49)	Body fiery-red, clothed with coarse erect setæ	*squamipennis*, Burm., [p. 158.
51 (46)	Mesosternal process bare.	
52 (55)	Elytra rugosely punctured.	
53 (54)	Body and tarsi rather long	*hieroglyphica*, Mén., [p. 159.
54 (53)	Body and tarsi short	*neglecta*, Hope, p. 160.
55 (52)	Elytra simply and sparsely punctured ..	*cariana*, Gestro, p. 161.
56 (17)	Mesosternum produced, narrow (not dilated before the middle coxæ)	*confusa*, G. & P., p. 161.

In the Munich Catalogue *P. mixta*, F. is quoted as an Indian species. I have examined the type of this from the Copenhagen Museum and find it to be a species only known to occur in Sumatra. The same specimen was the original of Weber's description, published earlier than that of Fabricius, and quoted by the latter. The Munich Catalogue therefore also errs in treating the species as synonymous with our *P. fusca* (*mandarina*, Weber).

115. Protætia cuprea.

Cetonia cuprea, *F., Syst. Ent.* 1775, p. 48; *G. & P., Monogr. Cet.* 1833, p. 192, pl. 34, fig. 3.
Cetonia florentina, *Herbst, Natursyst. Käf.* iii, 1790, p. 210; *G. & P., Monogr.* 1833, p. 191, pl. 34, fig. 2.
Cetonia metallica, *F., Ent. Syst.* i, 2, 1792, p. 128; *Syst. El.* ii, 1801, p. 138; *G. & P., Monogr. Cet.* 1833, p. 190, pl. 34, fig. 1; *Reitter, Deutsche Ent. Zeitschr.* xxxv, 1891, p. 63.

Olivaceous-green, brassy or coppery, with the pygidium, lower surface and legs lurid green, red or purple, and sometimes with the head and the extreme edges of the prothorax and elytra tinged with the same colour. The prothorax and scutellum are frequently rosy or fiery red. The upper surface is smooth, but not highly glazed, and the lower surface is very sparsely clothed with yellowish hairs.

The body is moderately stout and not much depressed above. The *head* is strongly and closely punctured and the *clypeus* quadrate, with the front margin strongly reflexed and very lightly excised in the middle. The *pronotum* is finely (sometimes very finely) and rather uniformly punctured, rather convex, strongly margined and very gently curved at the sides, and narrowly and deeply emarginate in the middle of the base. The *scutellum* is quite smooth and moderately long and pointed. The *elytra* have each a well-marked broad depression adjoining the suture upon the posterior half, in which there are lines of horseshoe-shaped impressions. In front of the depressions they are only very minutely punctured, and at the sides more strongly and closely. The lateral margins are gently sinuated behind the shoulders, and the apical angles sharp but not spinose. The *pygidium* is finely transversely corrugated, the metasternum less finely corrugated at the sides, and the *abdomen* almost smooth. The *sternal process* is flat and transversely oval in shape. The *front tibia* is armed with three slight sharp teeth, and the *hind tibia* has a fringe of yellow hairs at the inner edge.

The last ventral segment is finely punctured in the ♂ and rugose in the ♀.

Length 17–25 mm.; *breadth* 9·5–13 mm.

SIND: Karachi; PERSIA; SYRIA; ASIA MINOR; BALKAN PENINSULA; ITALY.

Various accounts have been published by Continental entomologists of the habits of this very common and widely-distributed insect, which in Europe is frequently confused with the common Rose-beetle (*Cetonia aurata*, L.), which it considerably resembles. In its adult form it feeds voraciously upon the juices of ripe fruit and other sweet liquids, and M. Fabre has watched them absorbing for a fortnight without intermission the juice of fruit supplied to them. This is during the summer and autumn following their emergence. The succeeding winter is passed (in Europe) in quiescence below the surface of the ground, and oviposition does not take place until the following year. The female deposits her eggs in accumulations of decaying leaves or other vegetable matter, or by preference in nests of the large Wood-Ants (*Formica rufa* and *pratensis*), burrowing a short distance below the surface for that purpose. The larvæ spend two or three years feeding upon the vegetable substance which they find at hand. Mr. Weaver is reported, in the Proceedings of the Entomological Society, 1851, p. 105, to have stated that he saw large quantities of the ants' eggs devoured by the larvæ, but it is probable that this was only due to their being removed from the nest and kept without other suitable food. Larvæ of various ages are commonly found together, the youngest according to Wasmann (Deutsche Entomologische Zeitschrift, 1887, xxxi, p. 45) generally living in the deeper parts of the nest and those more advanced nearer the surface, where the cocoon is also found. The latter is similar to a pigeon's egg in size and shape, and formed by the agglutination of fragments of the food-material, the interior being coated with matter apparently exuded from the intestine, producing a perfectly smooth and shining surface. The construction of the cocoon appears to be the chief function of the legs, progression being accomplished by the movements of the dorsal segments. After a period of one, two, or three months in the pupal stage the beetle ruptures the cocoon and makes its way above ground. The ants seem to resent the intrusion of the beetle into their nest, but owing to its hard exterior can scarcely injure, although they may hinder, it. The larvæ, however, are left undisturbed unless they give some special offence, and appear also to be to some extent protected by the toughness of their skin and the stiff bristles with which it is studded.

This larva is preyed upon by the parasitic wasp, *Scolia bifasciata*, the female of which seeks it out and, having paralysed it by stinging it in the ventral ganglion-mass, places an egg upon it. The issuing grub speedily devours the immobile victim, and having reduced it to an empty skin, forms its cocoon beside it.

The life-history of many other species of CETONIINÆ is probably similar in the main to that of *Protætia cuprea*.

116. Protætia pretiosa.

Cetonia pretiosa, *Nonfr.*, *Deutsche Ent. Zeitschr.* 1891, p. 270.
Potosia ceylanica, *Schoch,** *Mitth. Schweiz. Ent. Ges.* ix, 1894, p. 188.

Entirely deep golden-green or blue-green, with the tarsi generally deep blue; very smooth and shining and without markings or clothing, except some pale yellow hairs upon the legs and a few very minute setæ upon the sides of the metasternum.

It is a broad, robust and moderately convex species. The *head* is relatively small, scantily punctured, with the *clypeus* rather quadrate, the front margin strongly reflexed and very feebly notched. The *prothorax* is strongly punctured at the sides and scantily or not at all in the middle: it is narrow in front and strongly and rapidly dilated towards the base, the sides being little curved and the hind angles moderately distinct. The basal margin is not strongly excised before the *scutellum*, and the latter is rather short and triangular, without punctures except at the base. The *elytra* are minutely and scantily punctured in rows, with rather stronger scattered punctures near the apex. The *pygidium* is decorated with transverse striations, the sides of the *metasternum* are very coarsely strigose, and the *abdomen* is almost smooth beneath. The *sternal process* is short and broad, but slightly prominent, the *front tibia* has three very short teeth and the *hind tibia* has a fringe of short yellow hairs and is rather digitate at the end.

♂. The apical angles of the elytra are sharply produced and the pygidium is lightly strigose.

♀. The puncturation is stronger than in the ♂, and the pygidium and last ventral segment are closely strigose.

Length 22–27 mm.; *breadth* 12·5–15 mm.

Ceylon; Travancore: Trivandrum; W. Bengal: Chota Nagpur; Lower Burma: Tayokehmaw; Tenasserim; Siam; Annam.

Type in coll. Nonfried: that of *ceylanica* in the Polytechnikum, Zürich.

This is probably the species recorded by Bergé (Ann. Soc. Ent. Belg. 1892, p. 240) from Mandar, Bengal, as *Cetonia speciosissima*.

117. Protætia auripes.

Cetonia auripes, *Hope,** *Gray's Zool. Misc.* 1831, p. 24.
Cetonia ignipes, *Burm.*, *Handb. Ent.* iii, 1842, p. 465.

Bright metallic green, with the tibiæ and tarsi fiery red, very smooth and shining above and beneath, and without clothing, except slight fringes upon the legs.

The form is rather short, compact and convex. The *head* is punctured all over, with the front margin regularly rounded and slightly reflexed. The *prothorax* is smooth, except for a few

minute punctures near the margins; it is very narrow in front and broad behind, with the sides nearly straight, but feebly angulated before the middle, and the hind angles well marked. The *scutellum* is unpunctured and very blunt, and the *elytra* are very shining, with minute scattered punctures near the sides and broad shallow depressions beyond the middle; the apical angles are sharp but scarcely produced. The *pygidium* is punctured all over and has a shallow depression on each side. The *metasternum* is smooth in the middle and rugosely punctured at the sides, and the *abdomen* almost smooth. The *sternal process* is very short and broad and the *legs* are stout, the *front tibia* being armed with three very short but sharp teeth, and all the *tarsi* short and thick.

♂. The teeth of the front tibia are very feeble and the abdomen is a little hollowed beneath.

Length 19–21 mm.; *breadth* 10–12 mm.

Nepal; Assam: Sibsagar (*Atkinson*).

Type in the British Museum; that of *ignipes* in the Geneva Museum.

In the type specimen (but in no other that I have seen) there are two very minute white marginal spots behind the shoulder of each elytron and one at the posterior margin.

118. **Protætia montana.**

Cetonia montana, *Nonfr., Berlin. Ent. Zeitschr.* xxxvi, 1892, p. 371.

Bright metallic green and very smooth, with the tibiæ and tarsi fiery red, and the elytra decorated with two narrow transverse white stripes beyond the middle.

The form is very robust and convex. The *head* is punctured all over and the *clypeal margin* reflexed and nearly straight in front. The *pronotum* is smooth, except for large scattered punctures near the front and sides. It is narrow in front and the sides and base are strongly sinuated. The *scutellum* is unpunctured and rather long. The *elytra* are unpunctured, with the apical angles sharp but not produced, and the *pygidium* is shallowly rugose. The *metasternum* is smooth in the middle, coarsely punctured and strigose at the sides and thinly pubescent, and the *abdomen* is unpunctured. The *sternal process* is very short and broad. The *legs* are rather short and stout, the *front tibia* armed with three short and sharp teeth, and the *middle* and *hind tibiæ* provided with rather close fringes at the inner edge.

♂. The abdomen is slightly channelled beneath and the teeth of the front tibia are very feeble.

Length 27 mm.; *breadth* 14–15·5 mm.

Sikkim (*Col. Bingham*); Bengal: Phoobsering Lebong (Pusa Coll.).

Type in coll. Nonfried.

119. **Protætia orientalis.**

Cetonia orientalis, *G. & P.*, *Monogr. Cet.* 1833, p. 193, pl. 34, fig. 6; *Blanch.*, *Cat. Col. Mus. Paris*, 1850, p. 5, note.
Cetonia ærata, *Erichs.*, *Nov. Act. Acad. Leop.* 1834, xvi, *Suppl.* p. 240.
Cetonia speculifera, *Schaum* (nec *Swartz*), *Ann. Soc. Ent. France*, 1849, p. 277.

Metallic green, golden-green, coppery or coppery-purple above and beneath, with a very narrow white marginal line on each side of the pronotum and small scattered white markings, consisting of from four to seven small spots on each side of the pronotum, numerous indefinite spots near the lateral margins of the elytra, transverse median, postmedian and apical bars on each elytron, three spots (sometimes coalescing) on each side of the pygidium, numerous spots at the sides of the sternum, and transverse bars at the sides of the ventral segments.

The body is rather stout, little depressed above and rather strongly sculptured, with only a very scanty clothing of minute setæ at the sides beneath and at the apices of the elytra and pygidium. The *head* is coarsely and closely punctured and the *clypeus* quadrate, with the front margin strongly elevated and distinctly bilobed. The *pronotum* is coarsely but not closely punctured, except near the sides, strongly narrowed in front, scarcely angulated at the sides, with the hind angles moderately prominent and the base strongly excised in the middle. The *elytra* are irregularly sculptured with large transverse punctures or impressions, their lateral margins are moderately sinuated and the apical angles acute but not spinose. The *pygidium*, sides of the *metasternum*, *hind coxæ*, and lateral margins of the *ventral segments* are rugose, and the middle of the metasternum and abdomen are smooth. The *sternal process* is transversely oval. The *legs* are moderately short and stout and the *hind tibia* has a close but short fringe of yellow hairs.

The front tibia is armed in the ♀ with three short but sharp teeth, but in the ♂ the uppermost tooth is very small or quite absent and the hind tarsi are perceptibly longer than in the ♀.

Length 19–26 mm.; *breadth* 10·5–15 mm.

Kashmir (*teste* Blanchard); Himalayas (*teste* Gory & Perch.); China; Formosa; Japan.

120. **Protætia aurichalcea.** (Plate 1, fig. 7.)

Cetonia aurichalcea, *F.*, *Syst. Ent.* 1775, p. 49; *Oliv. Ent.* i, 6, 1789, p. 42, pl. 9, fig. 78.
Cetonia maculata, *F.**, *Spec. Ins.* i, 1781, p. 58; *G. & P.*, *Monogr. Cet.* 1833, p. 199, pl. 36, fig. 1; *Burm.*, *Handb. Ent.* iii, 1842, p. 476.

Deep bronze and very shining above and beneath, with opaque white markings, consisting of a large irregular patch on each side of the pronotum, each generally enclosing a small bare spot, a

minute spot close to the front margin of each elytron, a large irregular patch about the middle of each, adjoining the outer margin and sending two lobes towards the inner margin, a small irregular patch in the apical angle and several minute spots between the last and the median patch, and an irregular patch (sometimes broken up) on each side of the pygidium. The sides of the sternum are also white and there are two rows of spots along each side of the abdomen.

The shape is short and broad, rather depressed and very little narrowed behind. The *head* is strongly punctured, with the front margin rounded, reflexed, and scarcely perceptibly notched. The *pronotum* is strongly punctured, with a smooth line down the middle. It is narrow in front and rapidly widens to the base, which is strongly emarginate in the middle. The *scutellum* is unpunctured, rather short, and broad at the base. The *elytra* are finely and thinly punctured anteriorly, and more strongly and rugosely posteriorly. The lateral margins are moderately sinuated behind the shoulders and the apical angles are produced. The *pygidium* is rugose and finely setose, the *metasternum* smooth in the middle and rugose and thinly pubescent at the sides, and the *abdomen* sparsely punctured and pubescent. The *front tibia* is armed with three rather feeble teeth and the *middle* and *hind tibiæ* fringed with yellow hairs. The *sternal process* is very short and broad in front.

♂. The abdomen is well arched and the apical angles of the elytra are strongly spinose.

Length 14–20 mm.; *breadth* 8–10·5 mm.

BENGAL: Dacca, Calcutta (October), Chapra; MADRAS: Mysore; MAURITIUS.

Type (of *C. maculata*) in the British Museum: the type of *aurichalcea* formerly in the same collection has now disappeared.

121. Protætia peregrina.

Cetonia peregrina, *Herbst, Natursyst. Käf.* iii, 1790, p. 236, pl. 30, fig. 4.
Cetonia difformis, *F., Syst. Eleut.* ii, 1801, p. 154; *G. & P., Mon. Cet.* 1833, p. 200, pl. 36, fig. 2.
Anatona atrocœrulea, *Schoch,* Mitth. Schweiz. Ent. Gesells.* x, 1897, p. 56; *Kraatz, Deutsche Ent. Zeitschr.* 1897, p. 402.

Blue-black, smooth and very shining above and beneath, with an irregular white patch on each side of the prothorax, another upon the anterior part of each elytron (extending backwards to a little beyond the middle, where it usually sends a branch towards the suture), a third in the apical angle, one at each side of the pygidium, and a minute spot at the posterior angle of each ventral segment.

The body is very globose and compact. The *head* is rugosely punctured, acutely bidentate in front, with the angles reflexed. The *pronotum* is very finely and sparingly punctured, with the

sides gently curved and the base very feebly emarginate in the middle. The *scutellum* is short, triangular, moderately blunt and unpunctured. The *elytra* are strongly but sparingly punctured, some of the punctures forming longitudinal rows. The sutural angles are sharp but not at all produced, and the lateral margins are gently sinuated. The *pygidium* is shining but rather rugose. The *mesosternal process* is very short and broad, with a fringe of yellowish hairs beneath; the *metasternum* is coarsely rugose and thinly hairy at the sides, and the *abdomen* is unpunctured. The *front tibiæ* are tridentate and the *hind tibiæ* and *tarsi* bear a thin, but rather long, fringe of pale hairs.

♂. The abdomen is a little arched and entirely smooth and the fringe of the hind tarsus is long.

♀. The last ventral segment is coarsely punctured.

Length 13–16 mm.; *breadth* 7–8·5 mm.

BOMBAY: Poona; BENGAL: Murshidabad; MADRAS: Ganjam, Berhampur, Mysore.

Type not traced; that of *difformis* at Copenhagen and of *atrocærulea* at the Polytechnikum in Zürich.

In the Munich Catalogue the locality Java is given for this species but without any authority.

122. **Protætia impavida.**

Potosia impavida, *Janson, Cist. Ent.* ii, 1879, p. 538; iii, 1884, p. 110.

Cetonia dohrni, *Har., C. R. Soc. Ent. Belg.* 1880 p. 3.

Shining blue-black with minute white markings, variable in number but usually consisting principally of a median anterior spot, three transverse marks near the outer margin, and three near the inner margin of each elytron (the latter upon the posterior half), a minute spot on each side of the pygidium, and a row on each side of the sternum and abdomen.

The body is stout and rather convex. The *head* is strongly and rather evenly punctured, with the *clypeus* rather long, reflexed and feebly bilobed in front. The *prothorax* is very finely punctured on the disc and more strongly at the sides, with the hind angles rounded and the base strongly emarginate in the middle. The *scutellum* is not long and is unpunctured except in the anterior angles. The *elytra* are closely set with large crescentic punctures except in the region of the scutellum, where the punctures are fine and sparse. The apical angles are right angles and not produced. The *pygidium* and *propygidium* are finely rugose, and the latter is sharply angular in the middle of the posterior margin. The sides of the *metasternum* are coarsely rugose and thinly clothed with short yellow hairs, and the *abdomen* is almost smooth. The *sternal process* is transverse and feebly produced. The *front tibia* is armed with three acute teeth.

♀. The last two ventral segments are finely and closely punctured and the front tibiæ broader than those of the ♂.

Length 15·5–21 mm.; *breadth* 10–12 mm.

Punjab: Kulu; Kashmir: Gilgit; N.W. Frontier: Peshawur.

Type in coll. O. E. Janson.

123. **Protætia longipennis**, sp. n.

Copper-coloured, with the lower surface and legs fiery red and the upper surface opaque; decorated with white markings consisting of six or eight minute spots on each side of the pronotum, a small irregular patch at the outer margin of each elytron considerably beyond the middle, and minute spots between these and at the sides. There are also, a small spot on each side of the pygidium, two or three on each side of the sternum, and two rows on each side of the abdomen.

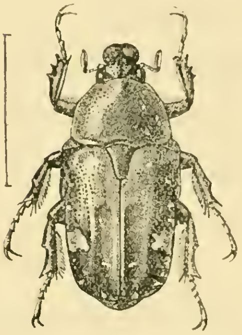

Fig. 32.
Protætia longipennis.

It is an elongate, depressed species, tapering gently from shoulders to apex. The *head* is sparingly punctured, but more closely at the sides of the *clypeus*, the front margin of which is very feebly excised in the middle. The *pronotum* is also sparingly punctured, except at the sides, the lateral margins are feebly angulated behind the middle, the posterior angles moderately prominent, and the base narrowly emarginate in the middle. The *scutellum* is rather elongate. The *elytra* are long, moderately punctured, and have a broad depression upon the posterior half near the suture. The sides are strongly sinuated and the apical angles not produced. The *pygidium* is rugose and clothed with short erect setæ. The *mesosternal process* is short and broad, the middle of the *metasternum* and *abdomen* smooth, the sides of the former rugose, those of the latter coarsely punctured and both thinly clothed with short hairs. The *front tibiæ* are sharply tridentate and the *hind tibiæ* closely fringed.

I have seen only the female, in which the last two ventral segments are strongly punctured and the spurs of the hind tibiæ very short and blunt.

Length 21 mm.; *breadth* 10·5 mm.

Burma: Karen-ni (*Tornatore*).

Type in the Genoa Museum.

I have seen a single specimen of this species in the Genoa Museum collection and a second in Mr. O. E. Janson's collection.

124. **Protætia caudata**, sp. n.

Coppery-red, with the pronotum, scutellum and elytra opaque and the pygidium, legs and sides of the body beneath clothed with tawny setæ. There are five or six very minute pale spots on each side of the pronotum, similar scattered spots upon the elytra, sometimes rather numerous and sometimes almost absent, one on each side of the pygidium, and a row on each side of the body beneath.

The body is rather convex and elongate and the pygidium rather narrow and prominent. The *clypeus* is strongly punctured and its front margin slightly reflexed and scarcely notched. The *pronotum* is closely punctured, the *scutellum* rather narrow and rounded at the apex, and the *elytra* bear strong annular punctures, except in the inner anterior part, with a well-marked longitudinal costa posteriorly. The outer margins are very deeply sinuated behind the shoulders, and the apical angles sharp but not spinose. The *pygidium* is closely strigose transversely, and the sides of the *metasternum* and *abdomen* are coarsely rugose. The *sternal process* is flat, broad and short. The *front tibia* is armed with three sharp teeth and the *middle* and *hind tibiæ* are closely fringed with yellow hairs at the inner edge.

I have not seen a male.

Length 18–21 mm.; *breadth* 9–11 mm.

Bhutan: Maria Basti (*L. Durel*); Sikkim: Darjiling, Karsiang (*R. P. Bretandeau*).

Type in the British Museum; co-types in coll. R. Oberthür.

This species is extremely like *P. prunina*, but narrower, with the scutellum blunter and the elytra much more deeply sinuated at the sides.

The type has been kindly presented to the British Museum by Monsieur Oberthür.

125. **Protætia prunina**, sp. n.

Coppery-red, sometimes with the legs and lower surface darker, the upper surface covered with an opaque chocolate-red bloom and decorated with small scattered yellowish spots, generally including a double row on each side of the pronotum, one before and one behind the middle of the elytral suture on each side, a small oblique intermediate streak adjoining the outer margin, two or three spots near the apex, and five or more near the shoulder. There are also a row of four at the base of the pygidium, several on each side of the sternum, and a single or double row on each side of the abdomen.

The form is stout and compact and the legs rather short. The *head* is strongly and irregularly punctured, with the anterior margin entire and barely reflexed. The *pronotum* is finely and regularly punctured, with the lateral margins bisinuated, the hind angles rather prominent and the base deeply excised in the middle.

The *scutellum* is rather narrow and pointed. The *elytra* are finely and irregularly punctured, gently sinuated at the sides, with the sutural margins elevated behind and acute at the apices. The *pygidium* is finely rugosely strigose, the *metasternum* very coarsely punctured at the sides, and the *abdomen* almost smooth. The *mesosternal process* is rather broad, the *front tibia* armed with three short teeth and the *middle* and *hind tibiæ* are fringed with close short reddish hairs. The *tarsi* are short and thick.

I have seen only female examples.

Length 22–23 mm.; *breadth* 13 mm.

Burma: Moulmein, Yun-za-lin (August).

Type in the British Museum.

126. **Protætia andamanarum.**

Protætia andamanarum, *Janson, Cist. Ent.* ii, 1877, p. 145.

Black, with the vertex of the head, the pronotum, scutellum and elytra opaque and sooty, and the elytra decorated with irregular orange-coloured spots, reduced in the male to a few inconspicuous marks at the outer margins, and in the female consisting of larger patches at the outer margins, a humeral spot or cluster, and two postmedian clusters near the inner margin of each elytron.

The form is robust and moderately convex. The *clypeus* is rather broad, finely punctured, with the margin curved, feebly reflexed in front, and scarcely notched. The *pronotum* is sparsely punctured, with the sides sinuated, the posterior angles well-marked, and the base deeply and narrowly excised in the middle. The *scutellum* is tapering, not very long nor very blunt. The *elytra* are feebly punctured and costate, and not strongly sinuated at the sides. The *pygidium* is transversely strigose, the sides of the *metasternum* are coarsely punctured, and the *abdomen* is almost smooth. The *mesosternal process* is small, moderately transverse and rounded in front. The *front tibiæ* are three-toothed, the *hind tibiæ* moderately fringed, and the *tarsi* rather short.

In addition to the difference of pattern distinguishing the sexes, the male has the apices of the elytra sharply spinose, the uppermost tooth of the front tibia nearly atrophied, the abdomen a little arched and the spurs of the hind tibia sharp. The female has the apical angles of the elytra blunt and the last ventral segment closely punctured.

Length 20–24 mm.; *breadth* 11–12·5 mm.

Andaman Is.

Type in coll. O. E. Janson.

127. **Protætia whitehousei.**

Cetonia whitehousei, *Schaum, Trans. Ent. Soc. Lond.* v, 1848, p. 72, pl. 11, fig. 3.

Head, legs and lower surface black and shining, pronotum,

scutellum, elytra and pygidium brick-red and opaque; decorated with bright yellow as follows:—a narrow marginal line at the anterior half of the pronotum on each side, a patch upon each mesosternal epimeron, one before the middle and one behind the middle of the lateral margin of each elytron and one in each apical angle, a spot on each side of the pygidium, and large patches at the sides of the metasternum and abdomen.

It is rather narrowly oval and depressed in shape. The *clypeus* is finely punctured and feebly emarginate in front. The *prothorax* is sparingly punctured at the sides, with the margins feebly curved and the hind angles well-marked. The *scutellum* is rather narrow and sharply pointed. The *elytra* are rather flat, punctured in longitudinal lines, well sinuated at the sides and sharply angular at the apices. The *pygidium* is finely rugose, the sides of the *metasternum* and *abdomen* are coarsely rugose and clothed with yellow hairs, and the middle of the abdomen is finely punctured. The *mesosternal process* is almost circular. The *front tibia* is armed with three slight teeth, and the *middle* and *hind tibiæ* bear rather long fringes of pale yellow hairs. The hind tibiæ are truncate at the end.

I have not seen a male of this species.

Length 20 mm.; *breadth* 10 mm.

CEYLON.

Type in coll. O. E. Janson.

Wrong figure-references are given for this insect both by Schaum and Gemminger & Harold.

128. **Protætia cinerea.**

Pseudaplasta cinerea, *Kraatz, Deutsche Ent. Zeitschr.* xx, 1898, p. 93.

Black or deep red-brown, with the head, prothorax, scutellum nd elytra covered with buff-coloured or greyish opaque matter, rather darker on each side of the middle of the pronotum, and decorated above with minute white spots, viz., one upon each side of the disc of the prothorax and from six to eight upon each elytron. There are three spots, frequently coalescing, upon each side of the pygidium, and the sides of the sternum and abdomen are broadly white.

This is a small species, short, stout and convex. The *head* is rugose and setose, with the *clypeus* rather long and the margin entire and feebly reflexed. The *prothorax* has the lateral margins very obtusely angulated, the hind angles indicated and the base very feebly emarginate in the middle. The *scutellum* is very short and its sides nearly straight. The *elytra* have rows of large punctures, the lateral margins are strongly sinuated and the apical angles sharp but scarcely produced. The *pygidium* is rugose and the *abdomen* very sparingly but distinctly punctured at the sides. The *front tibia* is armed with three sharp teeth,

and the *hind tibiæ* and *tarsi* have each a thin fringe of moderately long hairs.

The last ventral segment is smooth in the ♂ and coarsely punctured in the ♀, and the fringe of the hind tarsus of the ♂ is long.

Length 12–13 mm.; *breadth* 6–7 mm.

MADRAS: Mysore, Bangalore.

Type in the German Entomological National Museum.

129. **Protætia cupripes.**

Cetonia cupripes, *Wied.*,* *Germar's Mag. Ent.* iv, 1821, p. 146.
Protætia cupripes, *Burm.*, *Handb. Ent.* iii, 1842, p. 483.
Cetonia germari, *G. & P.*,* *Monogr. Cet.* 1833, p. 202, pl. 36, fig. 5.
Cetonia rufocuprea, *G. & P.*, *op. cit.* p. 205, pl. 37, fig. 4.
Pseudanatona rufocuprea, *Kraatz*, *Deutsche Ent. Zeitschr.* 1895, p. 112.

Shining coppery-red, with the pronotum, scutellum and elytra light chestnut colour and opaque, and decorated with whitish markings as follows:—a marginal line (irregular internally) on each side of the pronotum, a pair of minute spots at the front margin and another pair at the hind margin; the mesosternal epimera; a minute transverse spot at the outer margin of each elytron behind the shoulder, another near the middle of the inner margin, and two transverse posterior bands, interrupted and zigzagged. There are also irregular and inconstant markings upon the pygidium and the sides of the sternum and abdominal segments.

This is a small species, compact in shape and with short legs, which, together with the lower surface, head, pygidium and sides of the pronotum, are clothed with pale yellowish setæ. The *head* is coarsely punctured, with the *clypeal margin* strongly reflexed and emarginate in front (very slightly in the ♀, and strongly in the ♂). The *prothorax* is rather narrow in front, with the lateral margins angulated before the middle and the hind angles moderately well-marked; the base is strongly emarginate before the *scutellum*, which is short and blunt. The *elytra* are feebly striated, their sides strongly sinuated behind the shoulders and the apical angles spinose. The *pygidium* is setose and transversely strigose, the *metasternum* rather thickly clothed with yellow hairs at the sides and smooth in the middle, and the *abdomen* very scantily punctured and setose at the sides. The *mesosternal process* is very small, transverse and fringed with yellow setæ. The *legs* are setose, the *front tibiæ* bidentate and the *hind tibiæ* rather thickly fringed.

♂. The clypeal margin is rather produced in front and almost bidentate, and the abdomen is arched and almost smooth.

♀. The last ventral segment is rugosely punctured.

Length 14–16 mm.; *breadth* 7–7·5 mm.

MADRAS: Mysore; CEYLON: Wellawaya (*Mitschke*).

Type in the Copenhagen University Museum; that of *germari* in the Oxford Museum.

Dr. Kraatz, in the paper quoted above, has mentioned *Cetonia cupripes*, *germari* and *rufocuprea* as three distinct species, but the types of the first and second, now before me, are identical and undoubtedly belong to the species dealt with under the third name by Dr. Kraatz.

130. Protætia inanis.

Cetonia inanis,* *Wallace, Trans. Ent. Soc. Lond.* (3) iv, 1868, p. 580.
Cetonia inanis, *var.* cuprea, *Gestro, Ann. Mus. Genova,* (2) x, 1891, p. 851.

Uniform coppery or metallic green, with the back of the head, the pronotum, scutellum and elytra opaque.

This is a large species, short, stout and not much depressed, with short legs. The *head* is finely and not closely punctured, and the *clypeus* moderately narrow, rounded in front, with the front margin feebly reflexed and not notched. The *pronotum* is finely punctured in the middle and coarsely at the sides, the hind angles are moderately indicated and the base strongly emarginate in the middle. The *scutellum* is unpunctured and not long. The *elytra* have incomplete rows of punctures on the disc and are rugose at the sides and apices, with the apical angles sharp. The *pygidium* is finely transversely strigose, the *metasternum* coarsely rugulose at the sides, and the *abdomen* almost smooth. The *sternal process* is very short and broad. The *hind tibiæ* are densely digitated at the end and shortly fringed at the inner edge, and all the *tarsi* are short and thick.

♂. The front tibia has the upper tooth very feeble, the apical angles of the elytra are rather spinose, and the last two ventral segments are punctured at the sides.

♀. The front tibia is feebly bidentate, the apical angles of the elytra are sharp, but not spinose, and the last ventral segment is closely punctured all over.

Length 26 mm.; *breadth* 15 mm.

SIKKIM: Darjiling; ASSAM: Khasi Hills; BURMA: Karen Hills; PENANG; NIAS I.; JAVA.

Type in the British Museum.

Malayan examples of this species appear to be generally green, while the known Indian specimens are copper-coloured, and this phase is called by Dr. Gestro var. *cuprea*. Insufficient specimens have been examined, however, to determine to what extent the colour is constant.

131. Protætia regalis.

Protætia regalis, *Blanch.*, *Liste Cet. Mus. Paris*, 1842, p. 1; *Burm.*, *Handb. Ent.* iii. 1842, p. 490.
Cetonia withilli, *Bainbr.*,* *Trans. Ent. Soc. Lond.* 1842, p. 218.
Progastor regalis, *Thoms.*, *Le Nat.* 1880, p. 278.
Protætia regalis, *var.* horni, *Kraatz*, *Deutsche Ent. Zeitschr.* 1900, p. 144.

Coppery or almost black, with the legs and lower surface shining and the upper surface and pygidium opaque; decorated with pale yellow spots placed as follows:—a pair placed transversely near the middle of the pronotum, one near the middle of each lateral margin and one at each hind angle, some or all of these being occasionally absent; one on each elytron a little before the middle of the inner margin, another behind it, a third in the apical angle, and three at the outer margin alternating with the three preceding; three on each side of the pygidium and a double row on each side of the metasternum and abdomen, some of these frequently absent.

This is the largest known species of *Protætia*, stout and convex, and with rather short legs. The *head* is rather small, very lightly punctured, with the front margin straight and narrowly reflexed. The *pronotum* is finely punctured, short, narrow in front and broad behind, with the lateral margins slightly curved, the hind angles moderately distinct, and the basal margin strongly excised in the middle. The *scutellum* is unpunctured, not very long nor very blunt at the apex. The *elytra* are finely striate-punctate on the disc and irregularly punctured externally, and their apical angles are sharp. The *pygidium* is finely transversely strigose and the *metasternum* coarsely strigose at the sides. The *mesosternal process* is flat, nearly circular in shape and slightly prominent. The *front tibia* is armed with two sharp but short teeth, and the *hind tibia* is digitate at the end and fringed at the inner margin with short yellow hairs.

Fig. 33.—*Protætia regalis.*

♂. The apical angles of the elytra are spinose, and the abdomen is moderately punctured beneath.

♀. The apical angles of the elytra are sharp but not spinose, and the abdomen is unpunctured, except the last segment, which is densely punctured.

Length 26–28 mm.; *breadth* 14–16 mm.

BOMBAY; CEYLON: Kandy.

Type in the Paris Museum; that of *withilli* in the Oxford Museum.

Var. **horni**, *Kr.*

This name has been given to the Ceylonese representatives of the species, in which the ground-colour seems to be usually black instead of coppery-brown.

Type in the German Entomological National Museum.

132. Protætia bidentipes.

Protætia bidentipes, *Arrow,* Ann. Nat. Hist.* 1907, (7) xix, p. 351.

Sooty-black or piceous black, with the head, legs and underside shining, decorated with yellow spots distributed as follows:—a pair upon the vertex of the head, a pair at the middle and three at each lateral margin of the pronotum, the two posterior ones sometimes uniting, three placed in an oblique line upon the anterior half of each elytron, two adjoining the suture posteriorly and four adjoining the lateral margin, and a large patch at each side of the pygidium. There are also patches upon the mesosternal epimera, and the sides of the sternum and abdomen.

The *head* is thickly punctured, with the *clypeus* long and deeply notched in front. The *prothorax* is very transverse, distinctly but not densely punctured all over, with the sides strongly angulated in the middle and nearly parallel from there to the base, which is strongly emarginate before the scutellum. The *scutellum* is rather narrow. The *elytra* are parallel-sided, punctate-striate, with the sutural angles rather spinose. The *mesosternal process* is moderately prominent, nearly circular and not much dilated at the end. The *metasternum* is rugose at the sides, and the *abdomen* sparsely punctured. The *front tibiæ* are bidentate in both sexes. The *pygidium* is pubescent in two female specimens in the British Museum collection, but in a male in the Indian Museum, labelled (perhaps wrongly) "Rangoon," the setæ are scarcely visible. The yellow markings in that specimen are also of a deeper colour.

Length 18 mm.; *breadth* 10 mm.

NICOBAR IS.; ? BURMA: Rangoon.

Type in the British Museum.

133. Protætia rana, sp. n.

Deep chocolate-colour and velvety above, with a close indefinite reticulation of ochreous-yellow upon the head, prothorax, elytra, pygidium and the sides of the body beneath, absent from the scutellum and in part from the posterior half of the pronotum, upon which there is a small spot at each side of the basal margin. The legs and lower surface are shining metallic crimson.

The form is convex and compact, and the legs short. The upper surface is entirely opaque, rather strongly, but not closely or conspicuously, punctured, sparingly set with minute yellow setæ, and the legs and the sides of the body beneath are clothed with yellow hairs. The *head* is small and the *clypeus* rather long and not dilated

in front of the antennal orbits, with the front margin reflexed and entire. The *prothorax* is very much narrowed in front, with the posterior angles rounded and the base deeply emarginate in the middle. The *scutellum* is unpunctured, and rather long and narrow. The *elytra* have each a moderate costa on the posterior half, the sides are strongly sinuated and the apical angles spinose. The *pygidium* is slightly rugose, the sides of the *metasternum* and *abdomen* coarsely rugose and the middle very feebly punctured and shining. The *sternal process* is small, scarcely produced, and transverse. The *front tibia* is armed with three feeble teeth and the *hind tibiæ* have a moderately thick yellow fringe.

♂. The lateral teeth of the front tibia are almost obsolete and the last ventral segment is lightly punctured.

♀. The last ventral segment is rugosely punctured and the hind tarsi are very short.

Length 17–19 mm.; *breadth* 9·5–10·5 mm.

ASSAM: Shillong, Khasi Hills.

Type in the British Museum.

The only female specimen I have seen is in Mr. O. E. Janson's collection. There is a second male specimen in the collection of Mr. H. E. Andrewes, to whom the British Museum is indebted for the type.

134. **Protætia fusca.**

Cetonia fusca, *Herbst, Natursyst. Käfer*, iii, 1790, p. 257, pl. 32, fig. 4; *Voet, Cat. Col.* pl. iv, fig. 30.
Cetonia mandarina, *Weber* (part.), *Obs. Ent.* 1801, p. 68.
Protætia mandarinea, *Burm., Handb. Ent.* iii, 1842, p. 481; *Schaum, Ann. Soc. Ent. France*, 1849, p. 278.
Cetonia atomaria, *F.*,* *Syst. Eleuth.* ii, 1801, p. 153.
Cetonia fictilis, *Newm.*,* *Ent. Mag.* v, 1838, p. 169.

Coppery, with the head, legs and lower surface shining, and the pronotum, scutellum, elytra and pygidium opaque chocolate-colour, and finely and irregularly sprinkled with yellow points, most closely aggregated at the sides of the pronotum and in two masses at the outer edge of each elytron before and behind the middle. The head, legs, sides of the pronotum, sternum, abdomen and the pygidium are moderately thickly clothed with decumbent yellow setæ.

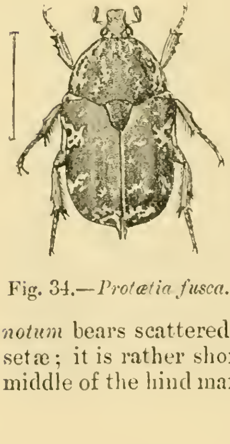

Fig. 34.—*Protætia fusca.*

The form is moderately short and convex. The *clypeus* is broad, closely punctured and very feebly emarginate in the middle of the front margin. The *pronotum* bears scattered punctures, close at the sides and containing setæ; it is rather short, broad behind and deeply emarginate at the middle of the hind margin. The *scutellum* is short and very bluntly

rounded at the apex. The *elytra* bear scattered punctures at the sides and apex, and the punctures contain minute setæ. The margins are gently sinuated behind the shoulders and the apical angles are produced into long spines. The middle of the *metasternum* and *abdomen* is quite smooth and bare, and the sides rugose and setose. The *sternal process* is very short and broad; and the *legs* are short, the *front tibia* armed with three teeth, the uppermost very slight, and the *hind tibia* closely fringed with yellow hairs at the inner edge.

♂. The abdomen is well arched, and the hind tibiæ have a longer and thicker fringe than in the female.

♀. The last abdominal segment is rugose.

Length 14–16 mm.; *breadth* 7–9 mm.

BENGAL: Calcutta, Chapra; ASSAM: Cachar; BURMA: Bhamo, Mandalay, Rangoon; TENASSERIM; SIAM; S. CHINA; MALAY PENINSULA; MALAY ARCHIPELAGO; POLYNESIA; N. QUEENSLAND; MAURITIUS.

Type in the Berlin Museum; that of *mandarina* lost; of *atomaria* in the Copenhagen Museum; of *fictilis* in the British Museum.

The type of *P. fusca* cannot be identified with absolute certainty. Prof. Kolbe, of the Berlin Museum, informs me that a specimen, perhaps the type, in that collection belongs to this species, whose identity I think may fairly be accepted from Herbst's figure, and its better original in Voet's Catalogue. The type of *P. mandarina*, Weber, which should be in the Copenhagen Museum, is lost, but a specimen from Westermann's collection preserved there as representing the species belongs to *P. acuminata*, F., and Weber's description appears to me to have been drawn up from that species and the present one jointly.

This is one of the most widely-distributed of all the CETONIINÆ. Mr. H. N. Ridley, of the Royal Botanic Gardens, Singapore, tells me that its larvæ are very injurious to Cannas and other cultivated plants, upon whose roots they feed. In Queensland the beetles have been found to attack the nests of the stingless bee, *Trigona*, no doubt for the sake of the stored honey.

135. Protætia acuminata.

Cetonia acuminata, *F.*,* *Syst. Ent.* 1775, p. 50; *G. & P., Monogr. Cet.* 1833, p. 203, pl. 37, fig. 1.
Protætia acuminata, *Burm., Handb. Ent.* iii, 1842, p. 479; *Schaum, Ann. Soc. Ent. France*, 1847, p. 277.
Cetonia marmorea, *Weber*,* *Observ. Ent.* 1801, p. 69.
Cetonia marmorata, *F.*,* *Syst. Eleut.* ii, 1801, p. 154.

Deep bronzy-black, with the clypeus, legs, lower surface, the scutellum and the elevated parts of the elytra shining, and the rest of the upper surface sooty; thinly clothed with yellow setæ at the sides, above and beneath, and speckled above with pale yellow, which is absent from the scutellum and the middle of the

posterior part of the pronotum, but forms a more or less indefinite arcuate transverse band behind the middle of the elytra. The sides of the pygidium, metasternum and abdomen are generally adorned with patches of the same colour.

The body is moderately elongate and depressed. The *head* is densely punctured and has a slight posterior longitudinal carina, the front margin of the *clypeus* being reflexed and entire. The *pronotum* is coarsely and thickly punctured, with a smooth middle line and two densely punctured impressions on each side of it, the posterior pair near the basal margin. The latter is deeply, but not broadly, emarginate in the middle, and the lateral margins are sinuated. The *scutellum* is very blunt and only punctured in the anterior angles. The *elytra* are distinctly and irregularly punctured and each has a strongly marked costa upon its posterior half. The sutural margins are strongly raised and the apical angles sharply produced. The *propygidium* is pointed and the *pygidium* finely rugose. The *metasternum* is coarsely rugose at the sides and the *abdomen* almost smooth. The *sternal process* is very short and broad. The *front tibia* is armed with three very short but sharp teeth and the *hind tibia* has a thin yellow fringe.

♂. The abdomen, including the last segment, is sparsely punctured beneath, the spurs of the hind tibiæ are short and sharp and the teeth of the front tibia very feeble.

♀. The last ventral segment is very thickly punctured and the spurs of the hind tibia are long and blunt.

Length 14–19 mm.; *breadth* 7–10·5 mm.

Burma: N. Khyen Hills, Bhamo; Andaman Is.; Nicobar Is.; Malay Peninsula; Java; Sumatra; Borneo; etc.

Type in the British Museum; type of *marmorea* in the Copenhagen Museum, and *marmorata* was described from the same specimen.

This species seems to be particularly abundant in the Andaman Is., where, besides the typical form, there is a variety, larger in size, in which the pale markings are more evenly distributed and the median band less distinct.

136. **Protætia binghami**, sp. n.

Dull coppery above and beneath and decorated with an indefinite ochreous tracery, including a double series of small spots (about six) on each side of the pronotum, four irregular transverse bands upon the elytra and the greater part of the pygidium.

Moderately elongate and depressed, clothed with fine scattered setæ above and beneath (which are rather closer at the sides) and rather thickly hairy at the sides of the metasternum. The *head* is rugosely punctured, with the *clypeus* small. the front margin entire, gently curved and reflexed. The *pronotum* is very strongly punctured all over, except upon the posterior half of the middle line; the sides are bisinuated, the hind angles well-marked and

the base deeply excised in the middle. The *scutellum* is long, very blunt at the apex, and sparingly punctured. The *elytra* are coarsely punctured, rugosely at the sides, deeply striated in the posterior depression, moderately sinuated behind the shoulders and acutely spinose at the apical angles. The *pygidium* is opaque, slightly rugose and setose, the *metasternum* smooth in the middle and thickly hairy at the sides, and the *abdomen* coarsely punctured and setose all over. The *mesosternal process* is very short and transverse, and the *front tibia* is armed with two feeble teeth.

Length 16·5–18 mm.; *breadth* 8·5–9·5 mm.

TENASSERIM.

Type in the British Museum.

I have seen only two specimens, collected by Colonels Bingham and Davidson (one of them now in Mr. O. E. Janson's collection). The species differs from *P. acuminata*, F., by its distinctly coppery or brassy colour, close puncturation above and below and the bidentate front tibiæ.

137. Protætia terrosa.

Cetonia terrosa, *G. & P., Monogr. Cet.* 1833, p. 264, pl. 51, fig. 1; *Janson, Trans. Ent. Soc. Lond.* 1901, p. 183.
Anoplochilus terrosus, *Burm., Handb. Ent.* iii, 1842, p. 509.
Eumimimetica terrosa, *Kraatz, Deutsche Ent. Zeitschr.* xxv, 1881, p. 264.
Cetonia irrorata, *Wallace,* Trans. Ent. Soc. Lond.* (3) iv, 1868, p. 588 (n. syn.).
Pseudanthracophora striatipennis, *Kraatz,* Deutsche Ent. Zeitschr.* 1898, p. 407.

Black and shining above and below, with the sides of the pronotum, the elytra (more thickly at the sides and apices) and the sides of the pygidium and sternum irregularly sprinkled with white, and with frequently one or two rows of white spots on each side of the abdomen.

The form is shortly oval and rather convex, the mesosternal process and the sides of the sternum are clothed with yellow hairs, and the legs are short. The *head* is densely rugose, with the *clypeal margin* rounded in front, feebly reflexed and armed with two short, sharp teeth. The *prothorax* is strongly and rather evenly punctured, rounded at the sides and deeply excised before the scutellum. The *scutellum* is short, broad in front and moderately blunt behind, with some punctures in the anterior angles. The *elytra* are coarsely and rugosely punctured in rows, with the lateral margins gently sinuated and the apical angles not produced. The *pygidium* and the sides of the *metasternum* are rugose and the *abdomen* is very smooth. The *mesosternal process* is very short and transverse and thickly hairy. The *front tibiæ* are strongly three-toothed, the *hind tibiæ* thinly fringed, and all the *tarsi* short.

The last ventral segment is lightly punctured in the ♂ and rugose in the ♀.

Length 13–16 mm.; *breadth* 7–8·5 mm.

DECCAN; BOMBAY: Belgaum, Surat; KATHIAWAR: Gogo; CENTRAL INDIA: Mhow; BENGAL: Chapra.

Type not traced; that of *irrorata* in coll. Janson; of *striatipennis* in the German Entomological National Museum.

This species has been taken upon the flowers of cotton. It was wrongly attributed to the Philippine Is. by Wallace.

138. Protætia cœnosa.

Anoplocheila cœnosa, *Westw.*,* *Trans. Ent. Soc. Lond.* v, 1849, p. 146, pl. 16, fig. 4.

Anoplocheila brunneoænea, *Westw.*,* *Trans. Ent. Soc. Lond.* v, 1849, p. 147, pl. 16, fig. 5 (n. syn.).

Coppery, clothed above and below with yellowish hairs, except at the middle of the metasternum and abdomen; the upper surface subopaque, and the elytra and pygidium sprinkled irregularly with minute yellow spots, which are closer at the sides and apex of the elytra and upon the pygidium. There is also a row of small yellow spots on each side of the abdomen.

The form is shortly oval, and rather globose and convex. The *head* and *prothorax* are rugosely punctured and densely pubescent. The *clypeus* is short, with the margin reflexed and a little notched in front. The *pronotum* is strongly curved at the sides, with the hind angles not well-marked and the base moderately emarginate in the middle. The *scutellum* is short, broad at the base and moderately blunt at the apex. The *elytra* have rows of strongly impressed annular punctures, the sides are gently sinuated and the apical angles rather blunt. The *pygidium* and the sides of the *metasternum* are rugose and the *abdomen* almost smooth. The *mesosternal process* is small, fringed at the end and very little dilated before the coxæ. The *front tibiæ* are strongly three-toothed and the *hind tibiæ* bear a rather long, but not thick, fringe of hairs. The *tarsi* are very short.

The last ventral segment of the ♀ is densely punctured. That of the ♂ is feebly punctured and the clypeal margin is more strongly reflexed.

Length 12·5–15 mm.; *breadth* 7–8 mm.

PUNJAB: Simla Hills (8700 ft., May).

Types of *cœnosa* and *brunneoænea* in the Oxford Museum.

139. Protætia squamipennis.

Protætia squamipennis, *Burm.*, *Handb. Ent.* iii, 1842, p. 478.

Eucetonia magnifica, *Kraatz*,* *Deutsche Ent. Zeitschr.* 1898, p. 15 (n. syn.).

Brilliant metallic crimson above and beneath, and clothed with erect yellow scaly setæ, the posterior median part of the pronotum,

the scutellum and the middle of the metasternum and abdomen only being bare or nearly bare. There are also rather thickly sprinkled yellow or whitish markings upon the prothorax, elytra (where they form a zigzag longitudinal stripe upon each, with transverse median and apical offshoots), pygidium and the sides of the metasternum, hind coxæ and abdomen.

The form is oval and convex. The *head* is strongly punctured, with a sharp longitudinal median carina behind and the front margin of the *clypeus* bilobed and strongly reflexed. The *prothorax* is densely punctured, except along the median line, and rather narrow in front, with the sides strongly sinuated, the hinder angles well marked, and the base deeply excised before the scutellum. The *scutellum* is smooth except in the anterior angles. The *elytra* are coarsely and irregularly punctured all over, with a well-marked costa upon each. The *pygidium* and the sides of the *metasternum* are rugose and the *abdomen* is almost smooth. The *mesosternal process* is very short, broad and densely setose, and the *front tibia* has two acute teeth and a very minute upper one.

♂. The clypeus is more strongly bilobed and reflexed and the abdomen a little arched beneath.

♀. The last ventral segment is coarsely punctured.

Length 12·5–16 mm.; *breadth* 7–9 mm.

MADRAS: Bangalore; CEYLON.

Type not traced; that of *magnifica* in the German Entomological National Museum.

140. **Protætia hieroglyphica.**

Cetonia hieroglyphica, *Ménétr.*, *Cat. raisonné,* 1832, p. 189.

Bronzy and moderately shining, with the legs sometimes metallic green, and with minute traces of nebulous grey markings above.

Elongate and rather parallel-sided, with moderately long legs. The *head* is strongly punctured, with the *clypeus* rather long and rectangular, the reflexed front margin nearly straight and feebly excised in the middle. The *prothorax* is coarsely and closely punctured except near the scutellum, with a small depression near the base on each side, and the sides are strongly bisinuated, the hind angles prominent, and the base strongly emarginate in the middle. The *scutellum* is smooth and the *elytra* are rugosely punctured except in the neighbourhood of the scutellum, where they are distinctly but not closely punctured. The apical angles are sharp but not produced. The *pygidium* is closely transversely strigose, the *metasternum* smooth in the middle and coarsely rugose and thinly clothed with tawny hairs at the sides, and the *abdomen* is decorated with large crescent-shaped punctures at the sides. The *sternal process* is short, broad and rounded in front, the *front tibiæ* are rather feebly tridentate, and the four *posterior tibiæ* fringed with yellow hairs.

♂. The abdomen is thinly sprinkled with simple punctures along the middle.

♀. The abdomen is quite smooth along the middle except the last segment, which is thickly punctured. The hind tarsi are shorter than those of the male.

Length 22–25 mm.; *breadth* 12·5–14·5 mm.

Punjab: Murree, Dehra Gazi Khan; Turkestan; Caspian Sea.

141. **Protætia neglecta.**

Cetonia neglecta, *Hope*,* *Gray's Zool. Miscellany*, 1831, p. 24.
Cetonia dalman, *G. & P.* (*nec* C. dalmanni, *Hope*), *Monogr. Cet.* 1833, p. 195, pl. 35, fig. 2.
Protætia puncticollis, *Burm.*, *Handb. Ent.* iii, 1842, p. 470; *Schaum*, *Ann. Soc. Ent. France*, 1849, p. 277.

Bronzy, with the legs and lower surface sometimes metallic green or red, the pronotum, scutellum and elytra covered with a brown-velvety bloom, the pronotum decorated, except along the middle line, with minute and closely-set greyish spots, the elytra with a fine greyish tracery, which is absent from the region around the scutellum. The surface is often denuded of the opaque clothing and then becomes entirely bronzy and moderately shining.

The form is compact and convex. The *head* is entirely coarsely punctured, with the front margin reflexed and minutely excised in the middle. The *pronotum* is coarsely and closely punctured, with a smooth middle line, on each side of which there are slight depressions; the sides are sinuous, the posterior angles moderately well marked, and the base deeply excised before the scutellum. The *scutellum* is unpunctured and rather long. The *elytra* are very strongly and rugosely punctured, except in the region adjacent to the scutellum, which is distinctly but not strongly punctured. The apical angles are not produced. The *pygidium* is closely granulated and minutely setose. The *sternal process* is very short and broad, and the *metasternum* is smooth in the middle, but coarsely rugose and hairy at the side. The *legs* are rather short, the *front tibia* armed with three rather sharp teeth, and the *middle* and *hind tibiæ* fringed with yellow hairs.

♂. The abdomen is sparingly punctured and thinly hairy at the sides, and the spines of the hind tibiæ are short and sharp.

♀. The abdomen is extremely smooth except the last segment, which is strongly punctured. The spurs of the hind tibiæ are long and blunt.

Length 20–22 mm.; *breadth* 11–12 mm.

Punjab: Simla Hills, Phagu, Theog, Matiana (8000–8700 ft., April, May, June); United Provinces: Naini Tal; Nepal; Assam: Manipur.

Type in the British Museum; that of *dalman*, G. & P., in the Oxford Museum.

142. **Protætia cariana.**

Cetonia cariana, *Gestro,** *Ann. Mus. Genova,* (2) x, 1891, p. 850.

Bronzy, with the legs and lower surface coppery-red; the prothorax, scutellum, elytra and pygidium clothed with a brown, or olivaceous, velvety bloom; the prothorax decorated, except along the middle line, with irregularly scattered yellowish spots, and the elytra with a fine tracery which is less diffused than in *P. neglecta*, tending to segregate in masses adjoining the inner and outer margins. The pygidium is speckled on each side of the middle line, and in the male the ventral segments are also speckled broadly on each side.

The form is convex and compact. The *clypeus* is rather finely and evenly punctured, with the front margin feebly reflexed and scarcely perceptibly notched. The *pronotum* is distinctly and evenly punctured, except along the middle line, it is narrow in front, with the sides feebly angulated in the middle and the base deeply emarginate before the scutellum. The *scutellum* is long, narrow and unpunctured. The *elytra* are rather finely and sparingly punctured, with the apical angles not sharp. The *pygidium* is transversely striolated but not rugose, and the *metasternum* smooth in the middle, but coarsely striolated and hairy at the sides. The *sternal process* is short and broad. The *legs* are stout, the *front tibia* armed with three very feeble teeth, and the *middle* and *hind tibiæ* fringed with long yellowish hairs.

♂. In addition to the markings upon the abdomen, mentioned above, this sex is distinguishable by the abdomen being feebly punctured, the hind tarsi longer, and the spines of the hind tibiæ shorter and sharper.

♀. The abdomen is extremely smooth and the last segment not thickly punctured as is usual in this group.

Length 19–25 mm.; *breadth* 12–14 mm.

SIKKIM: Mungphu, Darjiling; BURMA: Karen-ni, Ruby Mines.

Type in the Genoa Museum.

This species very closely resembles *P. neglecta*, Hope, but is distinguished by the much less closely punctured upper surface, the not rugose pygidium, the longer hind tarsi, feebly toothed front tibiæ, and the sexual peculiarities mentioned above.

143. **Protætia confusa.**

Cetonia confusa, *G. & P., Monogr. Cet.* 1833, p. 266, pl. 51, fig. 4.
Protætia piperina, *Westw.,** *Trans. Ent. Soc. Lond.* v, 1849, p. 144, pl. 16, fig. 2 (n. syn.).

Smoky-black, not metallic, with the head, legs and lower surface shining, and the prothorax, scutellum, elytra and pygidium opaque; the prothorax, elytra and pygidium decorated with a very fine whitish network or speckling, and the sides of the body beneath with less minute confluent spots.

The form is rather narrow, moderately depressed, and scarcely tapering behind. The *head* is closely punctured, not carinate nor pitted upon the forehead, with the front margin of the *clypeus* feebly reflexed and slightly excised in the middle. The *prothorax* is coarsely punctured, narrow in front, with the sides not much curved. The *scutellum* is long and not very blunt. The *elytra* are punctate-striate, with slight costæ, the sides are not strongly sinuated behind the shoulders and the apical angles are sharp but not spinose. The *pygidium* is finely rugose, and the sides of the *metasternum* and *abdomen* are rugosely punctured. The *sternal process* is prominent, narrow, rounded in front but not dilated. The *front tibia* is armed with three sharp teeth and the *hind tibia* closely fringed with yellow hairs at the inner edge.

♂. The abdomen is feebly channelled along the middle and the last segment is very smooth. The fringe upon the hind tibia is thick and the terminal spines are short and slender.

♀. The last ventral segment is finely punctured and the tibial spines are broad and blunt.

Length 20 mm.; *breadth* 9·5 mm.

United Provinces: Mussoori.

Type not traced; that of *piperina* in the Oxford Museum.

In the form of the sternal process *P. confusa* shows an approach to the genus *Cetonia*, but this part, although not dilated in front, is not laterally compressed, and the head, pygidium and other features exclude it from that genus.

144. Protætia alboguttata.

Cetonia alboguttata, *Vigors,* Zool. Journ.* ii, 1826, p. 238, pl. 9, fig. 3; *Burm., Handb. Ent.* iii, 1842, p. 493.
Cetonia saundersi, *Bainb.,* Trans. Ent. Soc. Lond.* 1842, p. 219.

Metallic green, deep blue or blue-black, with the pronotum, scutellum and elytra opaque, deep blue, and decorated with very conspicuous white spots, generally consisting of a pair upon the clypeus, a pair between the eyes, three at each lateral margin of the prothorax, two upon the disc and two near the basal emargination, three near the inner, and three near the outer, margin of each elytron, and one in each apical angle. There are also patches on each side of the pygidium and sternum, upon the femora, hind coxæ and abdomen, which are more developed in the male than in the female.

The form is elongate-oval and moderately convex, and the legs are rather long. The *clypeus* is long and well punctured, its margins being curved and gently reflexed. The *pronotum* is strongly punctured, narrow in front and bisinuate at each side, with the posterior angles well marked. The *scutellum* is rather long and not very blunt at the end. The *elytra* are strongly punctured, gently sinuated at the sides, with a sharp carina upon the posterior half of each, and the apical angles are sharp. The

pygidium is rugose, the *metasternum* rugose and hairy, except in the middle, and the *abdomen* very lightly punctured. The *mesosternal process* is very small and slightly transverse, and the *middle* and *hind tibiæ* have rather close fringes of pale hairs.

♂. The sides of the prothorax are very divergent and rather straight, the apices of the elytra rather spinose, the abdomen strongly arched and deeply and broadly excavated in the middle, with a median line of white spots in the basal part of the excavation. The front tibiæ and tarsi are rather elongated, and the lateral tibial teeth nearly obsolete. The hind tibiæ are rather attenuated and curved, the fringe is long and thick at the extremity, and the spurs are short and sharp.

♀. The puncturation of the whole upper surface is stronger, the sides of the prothorax are more curved, the apical angles of the elytra are not produced, the abdomen is convex beneath, without median spots, and the last segment, and sometimes those preceding, are well punctured. The legs are normal, the front tibia is armed with three short but sharp teeth, and the spurs of the hind tibiæ are long and blunt.

Length 13–22 mm.; *breadth* 6–10 mm.

BENGAL: Pusa, Ranchi; UNITED PROVINCES: Dehra Dun; BOMBAY: Surat, Belgaum; MADRAS: Mysore; CEYLON: Kandy, Peradeniya.

Type in the British Museum; that of *saundersi* in the Oxford Museum.

A female of this species in the Oxford Museum is of a golden-bronze colour.

This is the most peculiar and perhaps the commonest and most generally distributed Indian member of the genus. It is remarkable for the extreme variability in size, which can scarcely be paralleled in the CETONIINÆ, and also for the great difference between the sexes. Several of the distinctive features of the male appear quite foreign to the present genus, but the female is quite a normal *Protætia*.

Mr. Maxwell Lefroy records that it is taken at the roots of the Pipal Tree (*Eurostigmum religiosum*) and of *Panicum spontaneum*.

Genus **OXYCETONIA**, nov.

Gametis, *Burmeister* (part.), *Handb. Ent.* iii, 1842, p. 358.

TYPE, *Cetonia versicolor*, F.

Range. Tropical Asia and Mauritius.

Form ovate and moderately compact. Clypeus rather long, tapering, cleft at the end and without reflexed margin. Prothorax moderately broad at the base and abruptly excised before the scutellum. Scutellum short, broad at the base and moderately sharp at the apex. Elytra well sinuated behind the shoulders, with the apical angles sharp but not produced. Mesosternal process short, rounded in front but scarcely dilated. Front tibia

strongly tridentate. Hind tibia not digitated. Maxilla slender, with a long brush of hairs at the end.

The last ventral segment is punctured in the female and smooth in the male, and the spurs of the hind tibia are shorter and sharper in the latter.

This genus formed the first section of Burmeister's genus *Gametis*, but as that name was subsequently restricted by Lacordaire to the second section, it has been necessary to devise a new one for the present group. It is intermediate between the large genera *Glycyphana* and *Protætia*, but had not the mesosternal process broadly dilated in front of the middle coxæ as in both those genera. The general form and features are those of *Protætia*, but the bilobed clypeus without a raised margin connects it rather with *Glycyphana*.

The species of this genus are very abundant where they occur, and are remarkable for extreme variability of colour and pattern. All of them are spotted with white in a similar manner, but the ground-colour is extraordinarily inconstant.

Key to the Species.

1 (2)	Lobes of the clypeus very sharp	*versicolor*, F., p. 164.
2 (1)	Lobes of the clypeus blunt.	
3 (6)	Upper surface not setose: sides of pronotum not densely strigose.	
4 (5)	Pygidium transversely strigose	*albopunctata*, F., p. 166.
5 (4)	Pygidium marked with crescentic impressions	*andrewesi*, Jans., p. 167.
6 (3)	Upper surface setose: sides of pronotum densely strigose	*jucunda*, Fald., p. 168.

145. Oxycetonia versicolor.

Cetonia versicolor, *F., Syst. Ent.* 1775, p. 51: *Herbst, Fuessly's Archiv*, iv, 1783, p. 18, pl. 19, fig. 28; *G. & P., Mon. Cet.* 1833, p. 280, pl. 54, fig. 7; *Schaum, Ann. Soc. Ent. France*, 1849, p. 264.

Scarabæus thebanus, *Herbst, Beschäft. Berl. Ges. Nat.* iv, 1779, p. 324, pl. 7, fig. 8.

Var. Scarabæus cruentus, *Pallas, Icones Ins.* 1781, p. 21, pl. B, fig. A 24.
Scarabæus (Cetonia) sanguinolentus, *Gmelin, Syst. Nat.* i, 4, 1789, p. 1583.

Var. Cetonia variegata, *F., Syst. Ent.* 1775, p. 51; *Oliv., Ent.* i, 6, 1789, p. 47, pl. 5, fig. 31; *Herbst, Fuessly's Archiv*, iv, 1783, p. 18, pl. 19, fig. 29.
Cetonia luctuosa, *G. & P., Monogr. Cet.* 1833, p. 283, pl. 55, fig. 2.

The form is oval and convex and the upper surface devoid of hairs or setæ. The *head* is long and rugosely punctured and the *clypeus* very sharply bidentate. The *pronotum* is strongly and not densely punctured, with the sides angulated in the middle, the hind angles traceable, and the base sharply excised before the scutellum. The *scutellum* is triangular and moderately sharp at the apex.

The *elytra* are strongly punctate-striate, with the sides strongly sinuated behind the shoulders and the apical angles sharp but not produced. The *pygidium* is coarsely punctured and setose, the *metasternum* rugose and hairy, and the *abdomen* sparingly, but coarsely, punctured. The *mesosternal process* is slightly produced, and broad but not dilated in front. The *front tibiæ* are strongly tridentate, and all the *femora* are fringed with long yellow hairs.

The coloration is very variable, but the ground-colour is black and there are usually the following white markings:—a pair of minute spots upon the neck behind the eyes, a pair at the middle of the pronotum, another at the base (one or both of the latter pairs often absent) and a lateral border on each side, a spot at the apex of the scutellum, from five to eight spots on each elytron, and two (frequently coalescing) on each side of the pygidium. The sides of the sternum are broadly white and there are two rows of large spots on each side of the abdomen.

The sexes are almost alike, but the spurs of the hind tibia are rather shorter and sharper in the male.

Length 13–15 mm.; *breadth* 6·5–8 mm.

ASSAM: Silhet; BHUTAN; BENGAL: Calcutta; N.W. FRONTIER: Bannu; CENTRAL INDIA: Mhow; MADRAS: Kanara, Malabar, Bangalore; CEYLON; MAURITIUS; MADAGASCAR; BOURBON.

Type not traced; that of *variegata* in the Kiel Museum; that of *cruenta* in the Berlin Royal Museum.

The following phases may be distinguished.

Var. *a*.

Black, entirely shining, with the prothorax, except a pair of large black discoidal spots (coinciding with the minute white

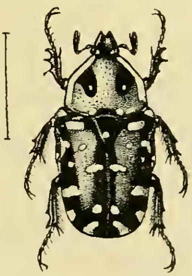

Fig. 35.
Oxycetonia versicolor, var. *a*.

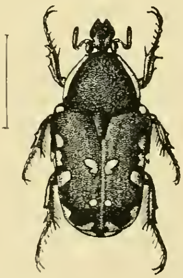

Fig. 36.
Oxycetonia versicolor, var. *d*.

spots described above), and a large vitta occupying the middle of each elytron red, and decorated with white as described.

Generally distributed except in Ceylon and the Madagascan region.

Var. *b.* **cruenta**, *Pall.*

Like the preceding, but opaque above.
MALABAR; CEYLON; MAURITIUS.

Var. *c.*

Wholly, or almost wholly, black, with white markings as described above, and shining.
BENGAL; MAURITIUS.

Var. *d.* **variegata**, *F.* (*luctuosa*, G. & P.).

Larger and broader; entirely black and opaque, with white markings as described.
CEYLON; MAURITIUS.

The range of variation in this species, although exceeded in *O. jucunda,* which follows, is very remarkable, extending not only to its coloration and the presence or absence of the velvety clothing of the upper surface, but to some extent to its form also, the typical phase being usually smaller and more convex than the other varieties, especially the var. *variegata.* The occurrence of the latter form in Ceylon and the Madagascan area, and apparently nowhere else, is a remarkable fact, presenting an interesting problem in geographical distribution. An exactly similar distribution is found in the case of *Protætia aurichalcea*, F., already dealt with. Both species must be regarded as immigrants into Mauritius from our region, for the endemic Cetoniine fauna of the Madagascan region is a peculiar one, and no representatives of it are found in Asia.

146. Oxycetonia albopunctata.

Cetonia albopunctata, *F.*, *Ent. Syst.*, *Suppl.* 1798, p. 129; *Syst. Eleut.* ii, 1801, p. 155.
Cetonia histrio, *Oliv.* (nec *Fab.*), *Ent.* i, 6, 1789, p. 45, pl. 10, fig. 94.
Gametis histrio, *Burm.*, *Handb. Ent.* iii, 1842, p. 364; *Schaum*, *Ann. Soc. Ent. France*, 1844, p. 373.
Var. Gametis bivittata, *Burm.*, *Handb. Ent.* iii, 1842, p. 363.

Black and shining, with the pronotum, scutellum, and elytra brick-red and opaque, the circumference of each elytron (interrupted in front) and a large discoidal spot, and a narrow lateral patch upon each side of the pronotum, black. There are also white markings, consisting of a narrow line at each lateral margin of the prothorax, a minute spot at the apex of the scutellum, one on each mesosternal epimeron, four at the outer margin of each elytron (the fourth in the apical angle), and a short transverse bar, more or less interrupted, crossing the suture before the middle, four spots placed transversely upon the pygidium, and a single or double series on each side of the body beneath.

It is moderately elongate, generally a little larger than *O. versicolor* and *jucunda*, and clothed with yellow hairs at the sides beneath. The *head* is long, finely and closely punctured, and

bluntly bidentate in front. The *pronotum* is rather evenly and not closely punctured, with the sides gently curved, the hind angles completely rounded off, and the base abruptly emarginate. The *scutellum* is bluntly pointed, and the *elytra* are decorated with rows of rather coarse punctures. The *pygidium* is finely transversely strigose, the *metasternum* rugose at the sides, and the *abdomen* scantily punctured.

♂. The spurs of the hind tibiæ are sharper than in the ♀.

Length 14–16 mm.; *breadth* 7–8 mm.

UNITED PROVINCES: Dehra Dun; BENGAL: Pusa; ASSAM: Silhet; BURMA: Momeit.

Type lost.

The coloration above described is that of the typical phase. The following varieties also occur:—

Var. *a*.

Entirely brick-red, with two large green patches at the middle of the pronotum and the white markings as usual.

Var. *b*. **bivittata**, *Burm.*

Deep green or black, with longitudinal brick-red vittæ, viz., a median one upon the pronotum, often continued upon the scutellum, a short one in each posterior angle of the pronotum, and one extending from shoulder to apex of each elytron, but often interrupted in the middle. There are also white markings as usual.

Hab. uncertain.

Type in Oxford Museum.

Var. *c*.

Entirely black, with the usual white markings.

BENGAL: Pusa, Rungpur; ASSAM: Helem.

The typical phase of this species is deceptively like *O. versicolor*, var. *a*, but the lobes of the clypeus are much less sharply pointed and the scutellum is not black, as in that species.

Mr. Maxwell Lefroy reports that this beetle feeds upon the pollen of cotton-flowers, and is also found upon rice, jute, sugar-cane, and other crops.

147. Oxycetonia andrewesi.

Glycyphana andrewesi, *Janson, Trans. Ent. Soc. Lond.* 1901, p. 182.

Deep, rather dull, green above and below, generally opaque on the pronotum, scutellum, elytra and pygidium; the posterior angles of the first, and an oblique stripe occupying the whole central part of each elytron, dull red (these red marks sometimes nearly or entirely absent), and with minute white spots distributed as follows (but some of them frequently wanting):—a pair placed transversely at the middle of the pronotum and a second pair anterior to it, a spot at the apex of the scutellum, one at the middle of each elytron, close to the inner margin, and two others

behiud it, one just behind the shoulder at the outer margin and two posterior to it, two on each side of the pygidium, the sides of the sternum, and a double row on each side of the abdomen.

The body is moderately short and depressed. The *head* is rather strongly punctured and the *clypeus* strongly but bluntly bilobed. The *pronotum* is rather triangular, strongly punctured, with the hind angles traceable and the base strongly emarginate in the middle. The *scutellum* is short, broad at the base and not very blunt at the apex. The *elytra* are coarsely punctate-striate, the *pygidium* decorated with crescentic impressions, the sides of the *metasternum* coarsely rugose, and the *abdomen* coarsely and sparingly punctured. The *mesosternal process* is slightly produced and broad. The *legs* and the sides of the sternum and abdomen are rather thickly clothed with tawny hairs.

♂. The abdomen is feeby arched and the apical angles of the elytra are rather spinose.

Length 15–16 mm; *breadth* 8–9 mm.

BOMBAY: Kanara; MADRAS: Nilgiri Hills, Shembaganur (near Madura).

Type in coll. Andrewes.

This species is very closely related to *O. albopunctata*, F., but the head and the pygidium are rather differently sculptured, and the mesosternal process is a little broader.

148. Oxycetonia jucunda.

Cetonia jucunda, *Faldermann, Mém. prés. à l'Acad. Sci. St. Pétersb.* ii, 1835, p. 386, pl. 4, figs. 4 & 5.
Cetonia prasina, *Hope*,* *Gray's Zool. Misc.* 1831, p. 25.
Var. Cetonia sanguinalis, *Hope*,* *l. c.*; *G. & P.*, *Monogr. Cet.* p. 286, pl. 55, fig. 6.
Var. Cetonia bealiæ, *G. & P.*, *op. cit.* p. 282, pl. 54, fig. 8.
Cetonia obscura, *G. & P.*, *op. cit.* p. 285.
Cetonia viridiobscura, *G. & P.*, *op. cit.* pl. 55, fig. 5.
Cetonia goryi, *Guér.*, *Rev. Zool.* 1840, p. 81; *Delessert*, *Souv. Voy.* i, 2, 1843, p. 46; *Schaum*, *Ann. Soc. Ent. France*, 1844, p. 372.

Fig. 37. *Oxycetonia jucunda*, typical form.

Green, olive, red, dark blue or black, opaque above in the fresh condition, clothed thinly above and thickly beneath with tawny hairs and setæ, and decorated with variable white markings, generally consisting of a discoidal spot and a marginal line on each side of the prothorax, a spot at the apex of the scutellum, four at the outer margin and one or two near the inner margin of each elytron, two on each side of the pygidium and a double row on each side of the abdomen. Some of these are frequently absent.

The form is slightly elongate and depressed. The *head* is long, densely and finely punctured, and the *clypeus* very bluntly bidentate. The *prothorax* is strongly punctured, with

the sides very closely and finely longitudinally strigose, the lateral margins strongly curved, the hind angles obliterated, and the base gently but abruptly emarginate in the middle. The *scutellum* is moderately long and not very blunt, and the *elytra* are strongly punctate-striate, with the sides deeply sinuated and the apical angles moderately sharp. The *pygidium* and the sides of the *metasternum* are rugose, and the *abdomen* bears only a few coarse punctures. The *sternal process* is slightly produced and rounded in front, the front *tibia* is strongly and sharply tridentate, and the *hind tibia* has a rather long, but not close, fringe of pale yellow hairs.

The sexes are similar, but the male has the spurs of the hind tibiæ shorter and sharper than the female.

Length 13–17 mm.; *breadth* 6–9 mm.

NEPAL; SIKKIM: Darjiling; ASSAM: Khasi Hills, Manipur; BENGAL: Calcutta; SIBERIA; CHINA; JAPAN.

Type not traced; those of *prasina* and *sanguinalis* in the British Museum.

The typical form, described above, is very abundant and widely distributed, but remarkable varieties more or less localized occur in India and the southern part of the enormous area of which the species is a native.

The best marked Indian varieties are the following:—

Var. *a*.

Green, with a blood-red patch at each shoulder and the outer apical part of each elytron, and the usual white markings.

SIKKIM: Darjiling.

Var. **sanguinalis**, *Hope*.

Like the preceding, but with the whole external margins of the elytra broadly red.

NEPAL.

Var. **bealiæ**, *G. & P.*

Usually larger and relatively broader; black, with the prothorax

Fig. 38.—*Oxycetonia jucunda*, var. *bealiæ*.

red, except a large black patch on each side of the middle, and

each elytron adorned with a large, rather transverse, red patch at the middle. The white markings are as usual.

Assam: Khasi Hills, Shillong.

Through all its extraordinary changes of colour and form this species is recognizable by the setæ upon its upper surface and the finely strigose lateral borders of the prothorax.

Genus STALAGMOSOMA.

Stalagmosoma, *Burm., Handb. Ent.* iii, 1842, p. 808: *Janson, Notes Leyd. Mus.* x, 1888, p. 109.

Stalagmopygus, *Kraatz, Deutsche Ent. Zeitschr.* 1882, p. 66.

Type, *Cetonia albella*, Pallas.

Range. Western Asia and Nubia.

Small, ovate, moderately elongate, convex and rather smooth. Clypeus a little longer than it is broad, elliptical, with the margin gently reflexed, strongly and uniformly curved in front, and not contracted in front of the eyes. Prothorax narrow in front, with the posterior angles slightly indicated and the base broadly emarginate. Scutellum short, not very blunt at the apex. Elytra strongly sinuated at the sides behind the shoulders and very sharply pointed at the apical angles. Legs not long; front tibia armed with three sharp teeth; middle and hind tibiæ acutely digitate at the end and fringed with long hairs at the inner edge. Mesosternum straight in front and not at all produced.

♂. The abdomen is not excavated. The uppermost tooth of the front tibia is rather more distant from the second tooth than in the female.

Only one species of this Palæarctic genus crosses the Indian frontier.

149. Stalagmosoma albella.

Scarabæus albellus, *Pallas, Reis*, i, 2, 1771, *App.*, p. 462; *Icones Ins.* 1781, p. 17, pl. A, fig. 18.

Stalagmosoma albella, *Burm., Handb. Ent.* iii, 1842, pp. 807, 808; *Schaum, Ann. Soc. Ent. France*, 1849, p. 266.

Cetonia alterna, *G. & P., Monogr. Ent.* 1833, p. 211, pl. 38, fig. 5.

Cetonia korini, *Fald., Nouv. Mém. Soc. Imp. Nat. Mosc.* iv, 1835, p. 302, pl. 10, fig. 8.

Cetonia lepida. *Fald., Bull. Soc. Mosc.* ix, 1836, p. 373, pl. 7, fig. 4.

Shining black above and below, the legs and anterior part of the body beneath clothed with short yellowish setæ and decorated with white markings, consisting of a broad border on each side of the pronotum, six spots on each elytron, viz. two placed obliquely at the shoulder, two obliquely behind the middle, one at the apical margin and one a little before it, near the suture, a patch on each side of the pygidium, and small spots at the sides of the hind coxæ and the ventral segments.

The *head* is finely and rugosely punctured and the *pronotum* rather strongly, but not very closely, punctured, with the sides regularly rounded and the base deeply emarginate in the middle. The *scutellum* is smooth, broad at the base, not long, and rather blunt at the apex. The *elytra* are deeply sculptured, with crescentic impressions in front and at the sides and four striæ upon the inner posterior part of each, and rugose at the apices; their lateral margins are sinuated, the sutural margins elevated, and the apical angles acute. The *pygidium* is finely rugose, the *metasternum* a little punctured in the middle and coarsely rugose at the sides, and the *abdomen* almost smooth.

Fig. 39.
Stalagmosoma albella.

Length 12–13 mm.; *breadth* 6–6·5 mm.

PUNJAB: Bannu, Murree; TURKESTAN: PERSIA; ARABIA; EGYPT.

Type in the Berlin Royal Museum.

Genus **CHILOLOBA**.

Chiloloba, *Burm., Handb. Ent.* iii, 1842, p. 501; *Lacord., Gen. Col.* iii, 1856, p. 530.

TYPE, *Cetonia acuta*, Wied.

Range. Throughout India.

Body elongate, highly glazed, but more or less clothed, both above and beneath, with yellow hairs. Clypeus produced, narrow, with the middle line carinate, the sides sloping downwards, the extremity excised, the angles bent upwards and outwards and blunt. Eyes very prominent. Prothorax not very broad behind, with the base deeply excised in the middle and slightly oblique at the sides. Scutellum long and narrow, with the sides concave and the apex subacute. Elytra deeply sinuated at the sides and strongly spinose at the apices. Sternal process flat and transverse. Front tibiæ tridentate. Mentum very long and narrow, deeply cleft; palpus with the basal joints small and the terminal joint enlarged. Maxilla short and stout, without terminal tuft, both inner and outer lobes armed internally with numerous closely-set spines. Mandible provided with a rather strong, curved and pointed blade, the inner membranous lobe reduced. Labrum broadly excised in front, with the edges of the emargination incurved.

♂. Abdomen arched and grooved. Front tarsi considerably longer than those of the ♀.

This very peculiar and aberrant genus consists of only a single species, which, however is exceedingly abundant.

150. **Chiloloba acuta.** (Plate II, fig. 4.)

Cetonia acuta, *Wied.*,* *Zool. Mag.* ii, 1, 1823, p. 87; *G. & P.*, *Monogr. Cet.* 1833, p. 284, pl. 55, fig. 3.
Cetonia perplexa, *G. & P.*,* *l. c.* fig. 4.
Chiloloba acuta, *Burm.*, *Handb. Ent.* iii, 1842, p. 503.

Bright metallic green, sometimes fiery red or deep blue, very smooth and shining, but irregularly punctured, and clothed with yellow hairs, which are long, dense and decumbent upon the sternum and sides of the abdomen, short and erect upon the rest of the body.

The body is long and a little depressed above and the legs are moderately slender. A fine carina extends from the *forehead* to the extremity of the *clypeus*, which is excised and its angles bluntly hooked, and the *head* is declivous and finely setose on each side, with longer and closer hairs between the eyes. The *pronotum* is closely punctured and setose, except along the middle line, but the setæ are very short and not conspicuous. The sides are gently curved, the hind angles rounded but moderately prominent, and the base deeply excised before the scutellum. The *scutellum* and *elytra* are thinly setose, but the clothing becomes much longer and thicker towards the extremity of the latter. The outer margins are very strongly sinuated behind the shoulders and converge very little from that point, and the inner margins are elevated posteriorly and produced into sharp spines at the apices. The *pygidium* is clothed with long hairs, the *metasternum* smooth in the middle and thickly clothed at the sides, and the *abdomen* scantily clothed except at the edges. The two terminal teeth of the *front tibia* are long and sharp and the *middle* and *hind tibiæ* and *tarsi* are fringed.

♂. The front tarsi are nearly twice as long as those of the female.

Length 14–18 mm.; *breadth* 7–8 mm.

SIKKIM; UNITED PROVINCES: Dehra Dun, Landaur; PUNJAB: Murree, Kangra Valley; CENTRAL INDIA: Mhow; BOMBAY: Belgaum; MADRAS: Bangalore, Malabar.

Type in the Copenhagen University Museum; that of *perplexa* in the Oxford Museum.

This is one of the most abundant CETONIINÆ throughout India. Messrs. H. E. Andrewes and T. R. Bell inform me that in Southern India it is found in great numbers upon stems of grass, etc., after the autumn rains, and Mr. Maxwell Lefroy states that it is injurious to juari (millet) and kutki (a leguminous crop), of which it damages the flowers. The organs of the mouth are peculiar in being much stronger and more adapted for biting than in normal CETONIINÆ.

Group 5. *Oxythyreides.*

The species which compose this group are almost all of small size and even the largest do not exceed the medium size. The most constant characteristic feature is the long, narrow, and very acutely-pointed scutellum, the sides of which are gently concave. The excision of the hind margin of the pronotum, which is practically universal in the preceding group, is here quite exceptional and it is very commonly replaced by a projecting lobe, partly or entirely concealing the scutellum. The clypeus is always simply rounded or very gently emarginate in front, and the sexes are not distinguished in any of the Indian species by marked external differences.

The group is best represented in Africa, and the genus *Clinteria* is the only truly Oriental one. That genus was associated by Lacordaire with *Agestrata*, etc., in his group Gymnetides, while *Epicometis* and *Leucocelis* were placed in the true Cetoniides, but the multiplication of known species renders that arrangement untenable.

Table of the Genera.

1 (4) Pronotum not lobed behind.	
2 (3) Scutellum moderately sharp-pointed, not flat	Epicometis, p. 173.
3 (2) Scutellum extremely sharp-pointed, quite flat	Oxythyrea, p. 175.
4 (1) Pronotum lobed behind	Clinteria, p. 176.

Genus EPICOMETIS.

Epicometis, *Burm., Handb. Ent.* iii, 1842, p. 434.
Tropinota, *Muls., Coléopt. France, Lamell.* 1842, p. 575 (preoccupied name).

Type, *Scarabæus hirtellus*, L. (Europe).

Range. Europe, N. Africa, W. Asia.

Form rather short and robust, clothed above and below with long hairs. Clypeus strongly and broadly notched in front, leaving the angles sharp and a little reflexed. Mandible very small, with the chitinous outer lobe triangular. Maxilla stout, terminating in a single sharp tooth and a long tuft of hairs; palpi slender. Mentum dilated and strongly bilobed in front; palpi short and stout. Prothorax subcircular, gently excised in front of the scutellum. Scutellum moderately broad in front, not very long, acute at the apex. Elytra strongly sinuated at the sides, not produced at the apical angles. Mesosternal process extremely

short, blunt. Front tibia armed with three acute teeth, the two terminal ones very long. Tarsi rather long and slender.

♂. The abdomen is arched and slightly grooved.

One species only is known in our region.

151. Epicometis squalida.

Scarabæus squalidus, *L., Syst. Nat.* 12th ed. 1767, i, 2, p. 556.
Cetonia crinita, *Charp., Hor. Ent.* 1825, p. 213.
Epicometis crinita, *Burm., Handb. Ent.* iii, 1842, p. 436; *Schaum, Ann. Soc. Ent. France,* 1849, p. 267.

Shining black, thickly clothed with yellow hairs, except upon the middle of the metasternum and abdomen, the costæ upon the pronotum and elytra, and the scutellum. The elytra are decorated with inconspicuous transverse yellow markings.

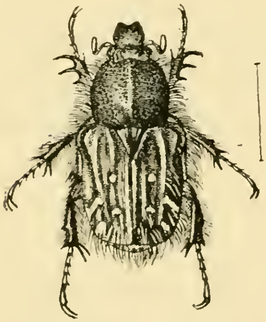

Fig. 40.—*Epicometis squalida.*

The *head* and *clypeus* are finely granulated and the *pronotum* rugosely punctured, with a narrow smooth carina extending from the front to the hind margin. The *prothorax* is rather narrow, scarcely broader than it is long, obtusely angulated at the lateral margin, with the hind angles feebly indicated and the base broadly and gently excised before the scutellum. The *scutellum* is almost smooth, and the *elytra* are rugosely punctured and striated, each having a smooth sutural costa and a lateral one which is divided at the shoulder by a wedge-shaped depression. The *pygidium* is finely rugose and the middle of the *metasternum* and *abdomen* very smooth and shining.

♂. The abdomen is excavated in the middle and entirely smooth.

♀. The ventral surface is convex and the last two segments are punctured and hairy.

Length 9·5–13 mm.; *breadth* 6–8 mm.

Baluchistan: Quetta; W. Asia; Europe; N. Africa.

This well-known and widely-distributed insect is very abundant in the Mediterranean region, where it inflicts serious injury upon various crops. It is reported to injure peach-blossoms by destroying the stamens, and in Greece, Corsica, Algeria, and other vine-growing countries, damages the buds of the growing vines (see Mayet, Ann. Soc. Ent. France, 1894, p. 5). These buds, which contain a quantity of a sweet gummy substance, are perhaps only attacked in the absence of ripe fruit or flowers. The larvæ are said to breed in the manure spread at the roots of the crops.

Genus OXYTHYREA.

Oxythyrea, *Muls.*,† *Coléopt. de France, Lamell.* 1842, p. 572; *Lacord., Gen. Col.* iii, 1856, p. 531.
Leucocelis, *Burm.*, *Handb. Ent.* iii, 1842, p. 421.—Type, *Cetonia hæmorrhoidalis*, F. (S. Africa).

Type, *Scarabæus sticticus*, L. (Europe).

Range. Europe, W. Asia and Africa.

Form rather elongate, smooth and shining above. Clypeus rather long, feebly emarginate and reflexed at the apex. Prothorax rather narrow, with the base scarcely or not at all emarginate before the scutellum. Scutellum small and extremely acute, with concave sides. Elytra very strongly sinuated at the outer margins, with the sutural angles sharp but not produced. Legs rather long, with the front tibiæ sharply toothed and the hind tibiæ digitate at the end and moderately fringed at the inner edge. Mesosternal process broadly truncate and not produced.

The great majority of the species are African and only a single (Palæarctic) form is known in our region.

152. Oxythyrea cinctella.

Cetonia cinctella, *Schaum, Analecta Entomologica*, 1841, p. 38.
Cetonia variegata, *G. & P.*, *Monogr. Cet.* 1833, p. 294, pl. 57, fig. 3.

Shining black, thinly clothed beneath with short yellowish hairs, and ornamented with opaque white markings consisting of a marginal band and a small basal spot on each side of the pronotum, numerous small elongate spots on the elytra, coalescing and becoming larger at the sides and apices, and large patches on each side of the pygidium, sternum and first four ventral segments.

Fig. 41.
Oxythyrea cinctella.

The shape is elongate and convex. The *clypeus* is rugosely punctured and feebly and broadly emarginate in front. The *prothorax* is much narrower than the elytra, rather evenly punctured, with the sides angulated before the middle, not greatly narrowed in front and nearly parallel behind. The base is gently rounded and almost imperceptibly emarginate before the scutellum. The *scutellum* is very acutely pointed and bears a few punctures. The *elytra* are deeply striated, the *pygidium* finely rugose, and the *metasternum* and *abdomen* sparsely punctured in the middle and more strongly at the sides. The *front tibia* is armed with two sharp teeth.

♂. The abdomen is slightly channelled.

Length 9–12·5 mm.; *breadth* 5–7 mm.

Baluchistan: Nushki District, Quetta.

† Mulsant's volume was published in August, and Burmeister's at a later date in the same year. Mulsant's name is therefore used for the genus.

Genus CLINTERIA.

Clinteria, *Burm.*, *Handb. Ent.* iii, 1842, p. 299; *Lacord.*, *Gen. Col.* iii, 1856, p. 501.
Tinclirea, *Thoms.*, *Le Naturaliste*, 1880, p. 268.—Type, *Cetonia klugi*, Hope (n. syn.).
Triclirea, *Schoch*, *Cat. Ceton.* 1896, p. 30.

Type, *Cetonia guttifera*, Burm.

Range. The Oriental and Ethiopian Regions.

Form compact, generally rather short. Clypeus quadrate, slightly bilobed. Eyes moderately prominent. Base of the pronotum drawn out into a blunt-pointed lobe, nearly concealing the scutellum; the sides converging towards the front in a nearly continuous curve. Scutellum long and very acutely pointed, the extreme apex alone visible. Elytra strongly sinuated at the outer margins, with the apical angles not acute. Sternum produced between the middle coxæ into a longer or shorter pointed process, the meso-metasternal suture completely obliterated. Legs not long, the front tibia armed with three sharp teeth. Chitinous lobe of mandible long and straight. Maxilla unarmed, densely hairy. Mentum broad and bilobed. Last joint of all the palpi rather large.

The sexual differences are slight. The front tibiæ are generally a very little more slender in the male, and the abdomen is longitudinally channelled beneath except in the first group of species.

Key to the Species.

1 (18) Sternal process strongly produced.
2 (11) Sternal process long.
3 (4) Sternal process slender .... *imperialis*, Payk., p. 177.
4 (3) Sternal process blunt and conical.
5 (6) Sternal process laterally compressed .... *tetraspilota*, Hope, p. 178.
6 (5) Sternal process not laterally compressed.
7 (10) Elytra spotted.
8 (9) Median spots of elytra placed obliquely.................... *auronotata*, Blanch., p. 179.
9 (8) Median spots of elytra placed transversely .... *truncata*, Arrow, p. 179.
10 (7) Elytra longitudinally striped .... *belli*, Janson, p. 180.
11 (2) Sternal process not long.
12 (17) Sternal process horizontal.
13 (14) Mesosternal epimera yellow .... *ducalis*, White, p. 180.
14 (13) Mesosternal epimera black.
15 (16) Body slightly tapering behind .. *oberthuri*, sp. n., p. 181.
16 (15) Body strongly tapering behind .. *malayensis*, Wallace, p. 182.
17 (12) Sternal process pointing obliquely downwards.................. *pantherina*, Parry, p. 182.
18 (1) Sternal process little produced.
19 (32) Upper surface opaque.
20 (31) Surface partly metallic, with yellowish markings.

21 (28) Elytra decorated with numerous irregular markings.
22 (25) Pronotum bearing spots on each side of the middle.
23 (24) Lobe of the pronotum not spotted. *chloronota*, Blanch., p. 183.
24 (23) Lobe of the pronotum spotted.... *spuria*, Burm., p. 184.
25 (22) Pronotum bearing a longitudinal median line.
26 (27) Upper surface not hairy .... *spilota*, Hope, p. 184.
27 (26) Upper surface hairy .... *hoffmeisteri*, White, p. 185.
28 (21) Elytra decorated each with 4 or 5 large marks (occasionally reduced).
29 (30) Lobe of the pronotum spotted.... *rufipennis*, Jans., p. 186.
30 (29) Lobe of the pronotum not spotted. *klugi*, Hope, p. 187.
31 (20) Surface black, with white markings. *caliginosa*, Jans., p. 188.
32 (19) Upper surface very shining.
33 (34) Apical angles of elytra rounded: hind tibia with three sharp terminal teeth .... *hearseiana*, Westw., p. 188.
34 (33) Apical angles of elytra sharp: hind tibia with one sharp terminal tooth.
35 (36) Pronotum white-spotted; sternal process pointed .... 14-*maculata*, F., p. 189.
36 (35) Pronotum without spots; sternal process very blunt.
37 (38) Elytra not distinctly produced at the sutural angles .... *cœrulea*, Herbst, p. 190.
38 (37) Elytra distinctly produced at the sutural angles................ *pumila*, Swartz, p. 191.

Clinteria undulata, Schoch, ascribed by that author to "India orientalis," I have found by examination of the type (now in the Zurich Museum) to be a Mexican insect (*Gymnetis marginicollis*, Burm.).

Clinteria tricolorata, Westw., has already been announced (Janson, Cist. Ent. ii. 1877, p 147) to be a South African species.

153. Clinteria imperialis.

Cetonia imperialis, *Paykull, Schönh. Syn. Ins.* i, 3, 1817, *App.*, p. 58; *Burm., Handb. Ent.* iii, 1842, p. 303.
Var. Clinteria incerta, *Parry, Trans. Ent. Soc. Lond.* v, 1848, p. 81, pl. 11, fig. 5.

Black, shining beneath and opaque above, with bright yellow markings consisting of an oval patch at the anterior half of each lateral margin of the pronotum, a spot on each mesosternal epimeron, an irregular transverse median patch and an apical one on each elytron, reaching the outer but not the inner margin, and a small spot at each lateral edge of the first and second ventral segments.

It is a large, moderately broad and compact species. The *clypeus* is closely punctured and rather strongly bilobed. The *pronotum*

is convex, thinly punctured, regularly rounded at the sides and produced into a rather pointed lobe behind. The *elytra* are rather smooth, with a few rows of fine punctures, the outer margins are moderately sinuated and the apical angles rounded. The *pygidium* is closely strigose transversely, the *metasternum* deeply grooved along the middle and strongly and rugosely punctured at the sides, and the *abdomen* strongly and irregularly punctured, except in the middle. The *mesosternal process* is long and slender, and the *front tibia* is armed with three very sharp teeth.

♂. The abdomen is slightly arched but not excavated.

The var. *incerta* differs only in the absence of pale spots from the mesosternal epimera.

Length 16–22 mm.; *breadth* 9–12 mm.

Ceylon: Peradeniya (March), Pundaluoya (April, May).

154. Clinteria tetraspilota.

Cetonia tetraspilota, *Hope, Trans. Zool. Soc. Lond.* i, 1835, p. 98 (1834); *Trans. Ent. Soc. Lond.* v, 1847, p. 35, pl. 4, fig. 8.

Black and opaque above, with the head, legs and lower surface shining, and decorated with pale yellow markings consisting of a large patch on each side of the pronotum, occasionally broken into two, a large irregular median patch upon each elytron touching the outer margin, a second large patch occupying the apical angle, and a row of minute spots on each side of the metasternum and abdomen.

The form is flat and moderately elongate. The *head* is long, closely punctured and a little elevated in the middle, and the *clypeus* is rather deeply notched in front. The *pronotum* is short, narrow in front and broad behind, distinctly punctured and strongly lobed at the base. The *elytra* are strongly striate-punctate, with the outer margins gently sinuated and the apical angles rounded. The *pygidium* is transversely strigose, the *metasternum* smooth in the middle and coarsely punctured at the sides, and the *abdomen* coarsely punctured at the sides and very feebly in the middle. The *mesosternal process* is long, laterally compressed, and directed obliquely downward, and the *front tibia* is armed with three acute teeth.

♂. The abdomen is not arched or excavated, but the front tibia is rather narrower and the hind tarsus a little longer than in the ♀.

Length 18–20 mm.; *breadth* 9–11 mm.

Bombay: Kanara; Madras.

Type not traced (in "coll. Sykes").

The yellow markings are subject to considerable variation. The median and apical patches of the elytra sometimes coalesce, and on the other hand the whole of the markings may be greatly reduced.

155. Clinteria auronotata.

Gymnetis auronotata, *Blanch., Liste Cet. Mus. Paris*, 1842, p. 16.
Clinteria guttifera, *Burm.,* Handb. Ent.* iii, 1842, p. 300.
Clinteria valida, *Lansb.,* Notes Leyd. Mus.* ix, 1887, p. 164.

Coppery-red, metallic indigo, or nearly black; opaque above, with the head, legs and lower surface shining; decorated with yellow, orange or vermilion spots, viz., one or two at the lateral margin of the pronotum (often wanting), one upon each meso-sternal epimeron, three (or less) upon each elytron (the first near the middle, the second at the outer edge a little behind the first, and the third at the apical margin), and one on each side of the pygidium. The sides of the sternum and abdomen are similarly decorated.

This is one of the largest species of the genus and is rather flattened and very broad across the shoulders. The *clypeus* is rather long and parallel-sided, not very deeply notched, and closely punctured. The *pronotum* is strongly punctured at the front and sides, narrow in front and broad behind, the sides very feebly curved, and the basal lobe moderately long. The *elytra* are strongly punctured in longitudinal lines and two of the dorsal intervals are slightly raised posteriorly. The *pygidium* is opaque, finely rugose and sometimes slightly setose. The *metasternum* is coarsely rugose, except in the middle, and the *abdomen* very sparingly punctured. The *sternal process* is long, slightly oblique, laterally compressed and rounded at the apex.

♂. The two terminal teeth of the front tibia are very sharp and the third rather feeble and more distant. The abdomen is not channelled.

♀. The three teeth of the front tibia are nearly equidistant.

Length 17–20 mm.; *breadth* 9–12 mm.

Bombay: Kanara; Madras: Nilgiri Hills, Trichinopoli, Bangalore, Kodaikanal.

Type in the Paris Museum; that of *valida* in M. Oberthür's collection; co-types of *C. guttifera* are contained in the Oxford and Geneva Museums.

The two median spots of each elytron sometimes coalesce, forming an oblique irregular band, and there is sometimes a marginal yellow line on each side of the pronotum.

156. Clinteria truncata.

Clinteria truncata, *Arrow,* Ann. Nat. Hist.* (7) xix, 1907, p. 352.

Black or very dark coppery, velvety and opaque above, with the head, legs and underside shining, and with white or yellow markings, consisting of a narrow line on each side of the prothorax, frequently interrupted or absent, a spot upon the mesosternal epimeron, two small spots placed close together behind the middle of each elytron and frequently coalescing, a minute external apical

spot, a large patch on each side of the pygidium, and a row of spots on each side of the sternum and abdomen.

The *head* is closely punctured, rather long and deeply notched in front. The *prothorax* is finely punctured, attenuated in front and strongly and rather sharply lobed behind. The *elytra* are rather parallel-sided, and little narrowed towards the extremity: they are coarsely punctured in rows, with two well-marked costæ upon each. The *sternal process* is conical, rather long and acuminate.

In the ♀ there are three sharp, equidistant teeth to the front tibia. In the ♂ the uppermost tooth is distant from the other two and much shorter.

The pale markings are liable to reduction and in one specimen in the British Museum have disappeared entirely.

Length 15–18 mm.; *breadth* 9–10 mm.

MADRAS: Nilgiri Hills, Naduvatam (7000 ft.).

Type in the British Museum.

157. **Clinteria belli.**

Clinteria belli, *Janson,* Trans. Ent. Soc. Lond.* 1901, p. 180, woodcut.

Greenish or reddish bronze, with the pronotum, elytra and pygidium opaque, and the head, legs and lower surface darker and shining; decorated with a pale yellow border on each side of the pronotum, an oblique stripe upon each elytron extending the greater part of its length and trifid at the posterior end, a patch upon each side of the pygidium, and small patches on each side of the sternum and abdominal segments.

The *head* is closely punctured, gently raised and a little less punctured along the middle, and the *clypeus* is rather deeply notched in front. The *pronotum* is lightly and sparingly punctured, with the basal lobe strong and rather sharp. The *elytra* have a sutural row of fine punctures and an incomplete inner row, and the external and apical margins are irregularly and more coarsely punctured. The median part of the *pygidium* is finely transversely striolated, the *metasternum* is coarsely punctured, and the *abdomen* very sparsely punctured at the sides. The *sternal process* is an elongate cone directed obliquely downwards.

♂. The abdomen is faintly channelled along the middle and the front tibiæ are more slender than those of the female.

Length 16–17 mm.; *breadth* 9·5 mm.

BOMBAY: Kanara (*T. R. Bell*).

Type in Mr. H. E. Andrewes's Collection.

158. **Clinteria ducalis.**

Clinteria ducalis, *White,* Proc. Zool. Soc. Lond.* 1856, p. 15, pl. 41, fig. 4.

Clinteria malayensis, *Gestro* (nec *Wallace*), *Ann. Mus. Genova,* (2) vi, 1888, p. 99.

Sooty black or blackish purple above, with the head, legs and

lower surface shining black; decorated with pale yellow markings consisting of two or more minute spots placed transversely across the middle of the pronotum, one on each mesosternal epimeron, an irregular median patch upon each elytron, reaching the outer but not the inner margin, and a transverse patch adjoining the apical margin, a minute spot (often absent) on each side of the pygidium, and a double series on each side of the abdomen.

Moderately elongate and not very convex above. The *head* is closely and rather finely punctured and deeply notched in front. The *prothorax* is rather strongly but irregularly punctured and the *elytra* are coarsely punctate-striate. The *pygidium* is sculptured with fine transverse punctures, the *metasternum* finely rugose and clothed with tawny hairs, and the *abdomen* very sparingly punctured. The *sternal process* is short, stout and blunt.

♂. The abdomen is faintly channelled beneath and the prothorax is more tapered anteriorly than in the female, with the sides almost straight.

Length 13–17 mm.; *breadth* 7–8 mm.

ASSAM: Silhet; BURMA: Karen-ni (*Doherty*), Pegu (*Atkinson*); TENASSERIM: Plapu, Moulmein (*L. Fea*, May 1887).

Type in the British Museum.

159. Clinteria oberthuri, sp. n.

Deep copper-colour or black, with the pronotum, elytra and pygidium opaque and the lower surface very thinly hairy. There is a minute pale yellow spot on each side of the middle of the pronotum, and each elytron is decorated with a pale yellow median patch at the outer margin, with a short lobe directed towards the suture, and a lunate apical spot at the posterior margin, not quite reaching the suture. There is a minute spot in each lateral angle of the pygidium and a single or double row of spots on each side of the abdomen beneath.

The body is moderately elongate and depressed, slightly tapering behind. The *head* is not very long, feebly sinuated at the front margin, coarsely and closely punctured, with a rugose pit on each side between the eyes. The *pronotum* is thinly punctured, feebly curved at the sides, and broadly and bluntly lobed behind. The *elytra* are punctate-striate, strongly sinuated behind the shoulders and rounded at the apical angles. The *pygidium* is closely striated transversely, the *metasternum* coarsely rugose at the sides, and the *abdomen* very coarsely punctured beneath. The *sternal process* is horizontal, conical and bluntly produced, and the *front tibia* bears three acute teeth.

The sexes are almost identical.

Length 14–15 mm.; *breadth* 7·5–8·5 mm.

SIKKIM: Karsiang (*R. P. Bretandeau*).

Type in the British Museum; co-types in coll. R. Oberthür.

The species is exceedingly like *C. ducalis*, but the clypeus is a

little broader and shorter, and the thoracic lobe shorter and blunter.

160. Clinteria malayensis.

Clinteria malayensis, *Wallace*,* *Trans. Ent. Soc. Lond.*, (3) iv, 1868, p. 531.

Velvety black or purplish black, with the clypeus, scutellum, legs and lower surface shining black or deep metallic crimson; decorated with two minute yellow spots near the front angles of the pronotum and two similar ones near the middle, a large patch beyond the middle of each elytron at the outer margin and a small quadrate or lunular one at the apical margin. There may be in addition a minute spot at each basal angle of the pygidium and a double series on each side of the abdomen.

The shape is short, compact and convex. The *head* is moderately punctured and not very deeply notched in front. The *pronotum* is irregularly punctured and the *elytra* coarsely punctate-striate. The *pygidium* is finely transversely strigose, the *metasternum* finely rugose and clothed with tawny hairs, and the *abdomen* sparingly punctured. The *sternal process* is short, stout and blunt.

I have not seen a male.

Length 13 mm.; *breadth* 8 mm.

Burma: Teinzo; Penang; Malacca.

Type in the British Museum.

This species is exceedingly like *C. ducalis*, but a little more stoutly built, the yellow markings are rather reduced and the sculpture of the head and pygidium is not quite the same.

The type specimen of *C. flavonotata*, G. & P., the origin of which is uncertain, is without the apical elytral spots, which are present in that of *C. malayensis* and a similar specimen in the Genoa Museum.

161. Clinteria pantherina.

Clinteria pantherina, *Parry*, *Trans. Ent. Soc. Lond.* v, 1848, p. 82, pl. 11, fig. 9.

Deep opaque chocolate colour, brighter and more reddish upon the elytra and pygidium, with the clypeus, legs and lower surface deep coppery red and shining; decorated with minute pale spots generally distributed as follows:—four placed rectangularly upon the anterior half of the pronotum, two upon each mesosternal epimeron, a spot common to both elytra immediately behind the scutellum and about nine others upon each, viz., one at the anterior margin, one at the outer margin just behind the shoulder, a pair placed transversely behind the middle of the outer margin, a pair just before the posterior margin, two near the sutural margin behind the middle, and one or two upon the anterior part of the

disc. There are also one or more spots at each lateral margin of the pygidium and a single or double series on each side of the sternum and abdomen.

The form is compact, convex, and slightly tapering from the shoulders to the apex. The *head* is densely punctured and its front margin feebly bilobed. The *prothorax* is moderately strongly and uniformly punctured, strongly narrowed in front and furnished with a rather narrow lobe behind. The *elytra* are rather coarsely punctate-striate, and the *pygidium* and the sides of the *metasternum* and *abdomen* are slightly rugose and hairy. The *sternal process* is short and conical and points obliquely downward. The *front tibia* is rather broad and armed with three sharp teeth.

♂. The abdomen is not arched or channelled.

Length 13–14 mm.; *breadth* 7–8 mm.

Ceylon: Peradeniya.

Type in coll. O. E. Janson.

162. Clinteria chloronota.

Clinteria chloronota, *Blanch., Cat. Coll. Ent. Paris*, 1850, p. 38.
Var. Clinteria pumila, *V. d. Poll* (nec *Swartz*), *Notes Leyd. Mus.* xiii, 1891, p. 184.

Deep chocolate colour, olive-green or black, opaque above, with the head, legs and lower surface shining and metallic and, together with the pygidium, more or less clothed with greyish setæ. The sides of the pronotum are narrowly bordered with white, there is a pair of spots at the middle of the disc and sometimes an anterior pair placed a little farther apart; the elytra are decorated with a minute common spot immediately behind the scutellum and about ten others upon each, the lateral and apical ones often larger than the rest and sometimes uniting together. The first spot on each elytron is closely adjacent to the thoracic lobe. The pygidium has an incomplete white border, which frequently breaks up into two anterior and two lateral spots, there are large patches at the sides of the sternum and usually a double row (sometimes coalescing) at the sides of the abdomen.

It is compact in shape and not much narrowed behind. The *head* is densely punctured, with the *clypeus* not long and rather feebly emarginate in front. The *prothorax* is narrow, with the sides angulated in the middle and distinctly diverging or nearly parallel behind; it is moderately punctured and the basal lobe is strong. The *elytra* are strongly punctate-striate, with rather blunt apical angles. The *pygidium* is rugosely punctured, the *metasternum* is rugose at the sides and very sparingly punctured in the middle, and the *abdomen* almost smooth. The *sternal process* is blunt and very little produced.

♂. The abdomen is not hollowed. The front tibia is armed with two apical teeth placed close together and an almost obsolete upper one.

♀. The front tibia is broad and armed with three rather blunt teeth.

Length 12–15 mm.; *breadth* 7·5–9 mm.

CEYLON: Kandy, Dikoya, Maskeliya, Pattipola (Jan.–April).

Type in the Paris Museum.

Mr. E. E. Green states that this species devours the blossoms of *Crotalaria* and prevents the formation of the seed.

C. chloronota varies very greatly in coloration, form and size. The single specimen which Mr. Van de Poll has tentatively suggested as *C. pumila*, Swartz (a very different insect), is almost free from opaque bloom and the pronotum is less closely punctured than usual.

163. Clinteria spuria.

Clinteria spuria, *Burm., Handb. Ent.* v, 1847, p. 555.

Deep chocolate colour, opaque above, with the head, pygidium and lower surface coppery and shining; decorated with yellow markings consisting of a narrow marginal line on each side of the pronotum, a pair of minute spots in the middle and one upon the basal lobe, one upon each mesosternal epimeron, and upon each elytron an anterior spot, a pair placed transversely behind the shoulder, a minute one near the middle of the inner margin, another behind it, a short transverse mark at the outer margin, a spot behind it, and a sinuous mark at the apex. The pygidium has a spot on each side and a short longitudinal mark in the middle of the base, and the abdomen has a double row of spots on each side.

Rather short and compact in form. The *head* is finely rugose with the front margin feebly excised. The *pronotum* is moderately closely punctured, and is narrow in front, with the sides regularly curved and the basal lobe not long. The *elytra* are coarsely punctate-striate, and the apical angles are slightly rounded. The *pygidium* and the sides of the *metasternum* are densely rugose, and the sides of the *abdomen* slightly so. The *sternal process* is scarcely produced and very blunt. The *front tibia* is armed with three sharp teeth.

♂. The abdomen is feebly channelled.

Length 13–14 mm.; *breadth* 7–8 mm.

BHUTAN; ASSAM: Khasi Hills, Manipur; BURMA: N. Khyen Hills.

164. Clinteria spilota.

Cetonia spilota, *Hope*,* *Gray's Zool. Misc.* 1831, p. 25.
Cetonia confinis, *id.*,* *l. c.*
Gymnetis confinis, *G. & P., Monogr. Cet.* 1833, p. 378, pl. 77, fig. 5.
Gymnetis viridipes, *G. & P.*,* *l. c.* p. 364, pl. 73, fig. 5; *Schaum, Ann. Soc. Ent. France,* 1849, p. 259.

Chocolate-red, sometimes with the prothorax and the sutural

region of the elytra, sometimes the greater part or the whole of the surface, dark green; the upper surface opaque, with partial metallic lustre, the lower surface shining and clothed upon the sternum and sides of the abdomen with long yellow hairs. The upper surface is decorated with pale yellow markings, consisting of a lateral border extending the whole length of each side of the pronotum, a narrow median longitudinal line and a small elongate spot upon the posterior lobe frequently united with the median line, which then extends from the front to the hind margin; the elytra bear variable scattered markings, sometimes consisting of about ten spots, sometimes coalescing into indefinite patches, but always with an indication of a transverse postmedian fascia upon each. The pygidium is marked with three spots, the middle one produced towards the apex, and the abdomen has a line of transverse spots on each side.

It is a small elongate species. The *head* is densely granulated and the *clypeus* feebly notched in front. The *prothorax* is rather narrow, strongly tapered anteriorly and moderately lobed behind; the upper surface is distinctly and rather uniformly punctured. The *elytra* are coarsely striate-punctate, with the sides strongly sinuated and the apical angles well marked. The *pygidium* is finely rugose, and the *metasternum* and *abdomen* are rather coarsely punctured. The *sternal process* is very short and blunt.

♂. The abdomen is strongly arched and excavated beneath.

Length 12–14 mm.; *breadth* 6–7 mm.

SIKKIM: Mungphu; ASSAM: Karsiang (5000 ft.); UNITED PROVINCES: Landaur, Mussoori; PUNJAB: Simla (7000 ft., May); BENGAL: Rajpur.

Type in the British Museum; types of *confinis* and *viridipes* in the Oxford Museum.

Found on flowers of white stonecrop by Mr. N. Annandale at Simla and upon thistles by Capt. Boys, according to Dr. Schaum.

165. Clinteria hoffmeisteri.

Clinteria hoffmeisteri, *White*,* *Ann. Nat. Hist.* xx, 1847, p. 341; *Proc. Zool. Soc. Lond.* 1856, p. 15, pl. 41, fig. 5.

Obscurely coppery, opaque above, with the head, pygidium, legs and lower surface shining, and clothed above and below, except at the middle of the metasternum and abdomen, with rather long yellowish hairs. The outer half of each elytron is brick-red, and the upper surface is also decorated with pale yellow markings as follows:—the lateral margins of the prothorax and a narrow median line, which is continued upon the exposed apex of the scutellum, an outer marginal stripe on the elytron, which is continued, more or less interruptedly, just within the sutural margin from the apex to about the middle, and an oblique discoidal stripe upon each elytron at the junction of the light and dark parts, continuous with the prothoracic border and not quite attaining

the posterior margin. The pygidium is decorated also with a median and two lateral spots, which are sometimes confluent.

This is a broad, robust and convex species. The *head* is finely rugose, with the clypeal margins reflexed and strongly rounded, but very feebly excised in front. The *pronotum* is closely punctured, rather narrow, contracted in front and broadly lobed behind. The *elytra* are punctate-striate, with the sides strongly sinuated behind the shoulders and the apical angles slightly rounded. The *pygidium* is finely rugose, the *metasternum* and *abdomen* very sparingly punctured in the middle and densely hairy at the sides. The *sternal process* is extremely short and blunt, and the *front tibia* armed with three sharp teeth.

♂. The abdomen is broadly channelled along the middle.

I have not seen the female.

Length 14–15 mm.: *breadth* 7·5 mm.

BENGAL.

Type in the British Museum.

This species is wrongly attributed to Java in the Munich Catalogue. Mr. Janson has received examples from India.

166. Clinteria rufipennis.

Clinteria rufipennis, *Janson,* The Entomologist*, xxii, 1889, p. 100.

Deep chocolate-red, opaque above, with the elytra brighter, and decorated with bright yellow markings consisting of a very broad lateral band on each side of the pronotum, indented in the middle, and a spot at the apex of the basal lobe, the mesosternal epimera, an anterior discoidal spot upon each elytron, a median spot nearer the suture, a lateral one a little posterior to the last and two apical ones, a large patch on each side of the pygidium and the sides of the sternum and abdomen. The lower surface is shining black, the legs and sternal process are red, and the head and scutellum coppery.

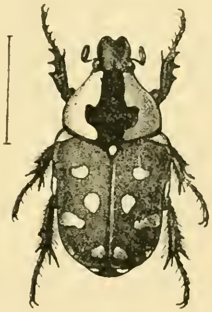

Fig. 42.
Clinteria rufipennis.

Oval in shape, and moderately broad and convex. The *head* is rugosely punctured and deeply notched in front. The *pronotum* is rather narrow in front, gently rounded at the sides and strongly lobed behind. The *elytra* have impressed lines of circular punctures, the sides are strongly sinuated behind the shoulders, and the apical angles are slightly rounded. The *pygidium* is rugose along the middle line and thinly pubescent, the *metasternum* is smooth in the middle, and the *abdomen* very sparingly and minutely punctured. The *sternal process* is very short and conical.

♂. The abdomen is strongly arched and grooved.
Length 14 mm.; *breadth* 7 mm.
CEYLON: Colombo.
Type in coll. O. E. Janson.

167. Clinteria klugi.

Cetonia klugi, *Hope*,* *Gray's Zool. Misc.* 1831, p. 25.
Gymnetis 12-guttata, *Blanch.*, *Liste Cet. Mus. Paris*, 1842, p. 16.
Clinteria hilaris, *Burm.*, *Handb. Ent.* iii, 1842, p. 303.
Clinteria flavopicta, *Blanch.*, *Cat. Col. Mus. Paris*, 1850, p. 37.
Var. Clinteria decora, *Janson*,* *Cist. Ent.* ii. 1881, p. 603.
Var. Gymnetis modesta, *Blanch.*,* *Liste Cet. Mus. Paris*, 1842, p. 16; *Cat. Col. Mus. Paris*, 1850, p. 37.
Tinclirea hilaris, *Thomson*, *Le Naturaliste*, 1880, p. 268.

Black or deep reddish chocolate, opaque, with the head, legs and lower surface shining; decorated with deep yellow or orange markings, consisting of a broad marginal band upon the pronotum, arising in the front angles and a little incurved near the hind angles, but frequently more or less abbreviated and sometimes absent, a large spot on each mesosternal epimeron, an irregular transverse median band on each elytron, sometimes broken into two spots, a spot anterior to this, and two apical spots, a patch on each side of the pygidium, and the sides of the sternum and abdomen.

The form is moderately elongate and depressed. The *head* is finely and rugosely punctured and rather deeply incised in front. The *prothorax* is regularly curved at the sides, strongly narrowed in front and moderately lobed behind. The *elytra* have rather strongly and closely punctured striæ, they are gently sinuated at the sides and almost rectangular at the apical angles. The *pygidium* is finely strigose, the *metasternum* is coarsely punctured at the sides, and each *ventral segment* has a transverse line of large punctures. The *sternal process* is short and conical.

♂. The abdomen is strongly arched and channelled beneath.
Length 13–17 mm.; *breadth* 6·5–9 mm.
BOMBAY: Igatpuri, Kanara; WESTERN BENGAL: Sultanpur, Paresnath, 4000–4400 ft., April.
Type in the British Museum; types of *flavopicta* and *modesta* in the Paris Museum, that of *decora* in coll. O. E. Janson.

C. klugi is a very variable species in size, relative proportions, degree of convexity, and pattern. The yellow markings vary considerably in tint and may become broken up, reduced, or partly (perhaps entirely) absent, and in certain specimens those near the elytral suture even show a tendency to coalesce in a longitudinal direction. The following are well-marked varieties:—

Var. **felix**, nov. This is a well-marked local colour-variety in which the bright pigment has reached the fullest development. The lateral yellow patches upon the pronotum cover the whole surface except a nearly straight median stripe; the median and posterior

patches of the elytra are all united, forming a broad C-shaped mark upon each, and the remaining anterior spot is almost united to the last. Three similar specimens taken many years ago by Col. Buckley are in the British Museum. They were captured in North India but the exact locality has not been recorded.

Var. **decora**, Janson. This is smaller and narrower than the typical form, the elytra are more strongly sculptured, the yellow border to the prothorax is narrow and the elytral markings more or less reduced.

Var. **modesta**, Blanch. This is a large variety in which the yellow markings have undergone considerable reduction.

168. Clinteria caliginosa.

Clinteria caliginosa, *Janson*, *The Entomologist*, xxii, 1889, p. 101.

Black, opaque above, with the head, scutellum, legs and lower surface shining; decorated with white markings consisting of a narrow marginal line on each side of the pronotum, extending the whole length but sometimes interrupted in the middle, a pair of spots close together and frequently coalescing at the middle of each elytron, two adjoining the outer margin posteriorly and one a little before the apical angle. There is a large spot on each side of the pygidium and the side pieces of the metasternum generally bear a similar spot.

The form is rather broad, depressed above and scarcely narrowed behind. The *head* is rugosely punctured, and the margins of the *clypeus* rather strongly reflexed and deeply notched in front. The *pronotum* is strongly punctured, the sides regularly curved and strongly contracted in front and the base not strongly lobed. The *elytra* are deeply punctate-striate, with two of the dorsal intervals raised, the sides are moderately sinuated and the apical angles broadly rounded. The *pygidium* is finely strigose and the sides of the *metasternum* and *abdomen* are moderately punctured. The *sternal process* is very short, but compressed and rather sharply pointed.

♂. The abdomen is arched and the uppermost tooth of the front tibia is rather distant from the other two and obtuse.

Length 12 mm.; *breadth* 7·5 mm.

Madras: Trichinopoli, Trivandrum, Kodaikanal.

Type in coll. O. E. Janson.

169. Clinteria hearseiana.

Clinteria hearseiana, *Westw.*,* *Trans. Ent. Soc. Lond.* v, 1849, p. 149, pl. 16, fig. 8.

Shining black above and below, often with the pronotum coppery and the elytra slightly metallic. The legs are reddish, and there are white markings consisting of an irregular lateral

line and a basal spot on each side of the pronotum and a spot at the apex of the basal lobe, the mesosternal epimera, and upon each elytron a median anterior spot, one about the middle near the suture, one before the apical angle and two adjoining the outer margin behind the middle ; a large spot on each side of the pygidium, the sides of the metasternum and a double row of spots on each side of the abdomen are also white.

The species is very smooth, rather convex, oval and slightly elongate. The *head* is closely and finely punctured, and the *clypeus* is dilated at the sides and rather narrow and sharply bilobed in front. The *pronotum* is finely and sparsely punctured, somewhat narrow in front, strongly rounded at the sides, and furnished with a rather pointed basal lobe. The *elytra* have deeply impressed rows of strong punctures, the sides are gently sinuated behind the shoulders and the apical angles rounded. The *pygidium* is finely rugose in the middle, the *metasternum* coarsely punctured at the sides, and the *abdomen* finely and thinly punctured. The *sternal process* is short but pointed. The *legs* are rather slender, the *front tibia* armed with three sharp teeth, the *hind tibia* produced into three sharp points at the extremity.

♂. The abdomen is broadly channelled beneath.

Length 14 mm. ; *breadth* 8 mm.

W. Bengal : Paresnath (4000–4400 ft., May).

Type in the Oxford Museum.

Mr. Annandale tells me that he found this insect in enormous numbers upon a flowering shrub in the above locality.

170. Clinteria 14-maculata.

Cetonia 14-maculata, *F.*, *Ent. Syst.* i, 2, 1792, p. 150.
Cetonia cœrulea, *Kannegieter* (nec *Herbst*), *Notes Leyd. Mus.* xiii, 1891, p. 183.
Cetonia cœrulea, *var.* megaspilota, *Kannegieter*,* *Notes Leyd. Mus.* xiii, 1891, p. 183.

Shining deep metallic green or blue, decorated above with white spots, as follows :—a minute one behind each front angle of the pronotum, a larger one before each hind angle (one or both frequently absent), one on each mesosternal epimeron, one immediately behind the thoracic lobe and common to both elytra, and about seven to eleven others upon each elytron, the principal being, one behind the front margin, three adjoining the outer margin, and three near the inner margin, alternating with the last, the third occupying the apical angle. The pygidium has a large white patch on each side, and the sides of the sternum and abdomen are partly or entirely barred with white.

The form is oval and rather convex. The *head* is densely punctured, and the *clypeus* long, narrowed in front and rather deeply notched. The *pronotum* is finely punctured, narrowed in front and provided with a rather strong and pointed lobe behind. The

elytra have incomplete rows of very coarse punctures, the sides are strongly sinuated behind the shoulders, and the apical angles are sharp. There is a slight depression in the scutellar region. The *pygidium* is finely rugose and thinly clothed with tawny setæ, and the *metasternum* and *abdomen* are smooth in the middle and finely punctured at the sides. The *sternal process* is feeble but rather sharply pointed. The *legs* are rather short, the *front tibia* is tridentate, and the extremity of the *hind tibia* is produced beneath into a single tooth.

♂. The abdomen is slightly channelled and the front tibia rather slender, with the third tooth almost obsolete.

Length 14–16 mm.; *breadth* 7·5–9 mm.

CEYLON: Colombo, Trincomali.

Type not traced (in coll. Lee); that of var. *megaspilota* in coll. O. E. Janson.

The var. *megaspilota*, Kanneg., is distinguished only by the rather large size of the white spots. A series of specimens received by Mr. E. E. Green from Trincomali belong to this form.

171. **Clinteria cœrulea.** (Plate I, fig. 8.)

Cetonia cœrulea, *Herbst, Fuessly's Archiv*, iv, 1783, p. 19, pl. 19, fig. 30; *Natursyst. Käf.* iii, 1790, p. 234, pl. 30, fig. 2; *Oliv., Ent.* i, 6, 1789, p. 47, pl. 5, fig. 31 *a*.
Gymnetis cœrulea, *G. & P., Monogr. Cet.* 1833, p. 378, pl. 77, fig. 4.
Clinteria cœrulea, *Burm., Handb. Ent.* iii, 1842, p. 305.

Shining blue-black, with the prothorax golden-red, its margins and the head metallic-green, and with five to seven small white spots upon each elytron, including one just behind the front margin, a second directly behind that, two near the sutural margin and two at the lateral margin upon the posterior half. The pygidium has a large irregular patch on each side, and the sides of the sternum, hind coxæ and abdomen are more or less spotted with white.

The shape is oval and rather convex. The *head* is densely punctured and the *clypeus* long and moderately notched in front. The *pronotum* is very finely and sparingly punctured, very convex, narrowed in front and strongly lobed behind. The *elytra* have rows of very coarse punctures, the sides are strongly sinuated and the apical angles sharp. There is a slight depression in the scutellar region. The *pygidium* is finely rugose and clothed with tawny setæ, and the *metasternum* and *abdomen* are smooth in the middle and moderately punctured at the sides. The *sternal process* is very short and a little compressed laterally. The *legs* are rather short, the *front tibia* is tridentate, and the extremity of the *hind tibia* is produced beneath into a single tooth.

♂. The front tibia is more slender than that of the female and the uppermost tooth is almost obsolete.

Length 14–16 mm.; *breadth* 7·5–9 mm.

MADRAS: Coimbatore.

172. **Clinteria pumila.**

Cetonia pumila, *Swartz*,* *Schönh. Syn. Ins.* i, 3, 1817, *App.*, p. 47.
Clinteria pumila, *Burm.*, *Handb. Ent.* iii, 1842, p. 306.

Black, very smooth and shining, the elytra sprinkled with small white spots, viz., upon each, three near the sutural margin extending from the middle to the apical angle, two placed rather obliquely in the anterior part, five or six placed irregularly along the lateral margin and one sublateral one behind the middle. The sides of the first three ventral segments bear transverse white marks at the posterior margins, and the pygidium and sides of the body are thinly clothed with short tawny hairs.

The species is small and rather narrow in form. The *head* is densely and rugosely punctured and the *clypeus* rather feebly emarginate in front. The *pronotum* is very lightly punctured upon the disc and rather strongly at the front and sides. The hind angles are completely rounded and the posterior lobe is rather obtuse. The *elytra* are strongly and coarsely punctured in irregular rows, the lateral margins strongly sinuated behind the shoulders and the apical angles produced. The *pygidium* is rather finely strigose, the *metasternum* coarsely rugose, and the *abdomen* roughly punctured at the sides. The *mesosternal process* is distinctly prominent and a little compressed at the end. The *front tibia* bears three teeth, the uppermost short and obtuse, and the *hind tibia* is produced beneath into a single tooth.

Length 12 mm.; *breadth* 7 mm.

Bengal (?); Ceylon: Hambantota (November—*T. B. Fletcher*).

Type in the Stockholm Museum.

This description is made from the type specimen, which is in bad condition, but I believe is specifically distinct from the two preceding. The spots upon the elytra are as in *C.* 14-*maculata*, but there are none upon the pronotum or pygidium; the clypeus is only slightly notched at the margin and the elytra are markedly produced at the apical angles. It is very different from the variety of *C. chloronota* described by Mr. Van de Poll as probably *C. pumila* (Notes Leyd. Mus. xiii, 1891, p. 184).

Mr. Bainbrigge Fletcher has brought two specimens (which also are not very well preserved) from Ceylon. These agree with the type, except that in one the pygidium bears two minute white spots on each side and the elytra bear a common spot adjacent to the scutellum.

Group 6. *Lomapterides.*

This group consists of the large genus *Lomaptera*, peculiar to New Guinea and the neighbouring islands, together with a few smaller Oriental genera. The species are of rather large size, flat, elongate, and remarkably smooth and shining, without any superimposed ornamentation and almost devoid of hairs. The clypeus is deeply excised in front and the pronotum is produced into a strong

lobe above the scutellum, which is very long, narrow and sharply pointed.

The Indian species are very few and belong to the two genera shown below.

Table of the Genera.

1 (2)	Clypeus spinose at the sides	AGESTRATA, p. 192.
2 (1)	Clypeus deeply cleft	THAUMASTOPEUS, p. 194.

Genus **AGESTRATA.**

Agestrata, *Eschscholtz, Zool. Atlas*, i, 1829, p. 13; *Burm., Handb. Ent.* iii, 1842, p. 306; *G. & P., Monogr. Cet.* 1833, p. 304; *Lacord., Gen. Col.* iii, 1856, p. 501.
Tetragonus, *G. & P., l. c.* p. 42. (No type.)

TYPE, *Agestrata luzonica*, Eschs. (Philippine Is.).

Range. Tropical Asia.

Body very elongate and parallel-sided, extremely smooth and shining. Clypeus flat and rather narrow, with the sides elevated and the front margin very broadly excised, leaving the angles acutely projecting. Eyes large and prominent. Club of the antenna long. Pronotum flat, with the front angles indistinct, the hind angles rounded and the base strongly lobed above the scutellum. Scutellum long, narrow and very acute at the apex, which projects beyond the thoracic lobe. Elytra very smooth, gently sinuated behind the shoulders. Pygidium short and broad, with a transverse carina producing a ventral face. Mesosternal process forming a short blunt tubercle: the meso-metasternal suture very distinct. Front tibia armed with three sharp teeth, rather distant from each other. Four posterior tibiæ without internal fringes or external spines, but produced into several sharp spines at the extremity. Mandible with the exterior lobe slight and not long, the interior flange rather broad and strong. Maxilla stout, with the lobes short and thickly hairy. Mentum very deeply cleft.

The abdomen and legs are alike in the two sexes, but the club of the antenna is longer in the male and the sides of the prothorax are more divergent behind.

There is only one exceedingly variable species known in our region.

173. **Agestrata orichalcea.** (Fig. 2, p. 5.)

Scarabæus orichalceus, *Linn., Amœn. Acad.* vii, 1769, p. 507; *Schaum, Ann. Soc. Ent. France*, 1849, p. 259.
Cetonia chinensis, *Fab.*,* *Syst. Ent.* 1775, p. 42.
Scarabæus oblongus, *Brown, Illustr. of Zool.* 1776, p. 122, pl. 49, fig. 4.

Agestrata chinensis, *G. & P., Monogr. Cet.* 1833, p. 305, pl. 59, fig. 2; *Burm., Handb. Ent.* iii, 1842, p. 309.
Var. Cetonia nigrita, *Fab., Syst. Ent.* 1775, p. 43.
Agestrata gagates, *Hope, Proc. Ent. Soc.* 1841, p. 33.
Agestrata withilli, *Hope, l. c.*
Var. Agestrata samson, *Sharp, Ent. Mon. Mag.* xi, 1874, p. 35 (n. syn.).

Metallic blue, green, purplish or black, with the coxæ, femora, mesosternal epimera, pygidium and sides of the sternum and abdomen orange-red, and sometimes an inconspicuous narrow patch of the same colour at the lateral edge of the prothorax.

The body is very long and narrow and rather flat. The *clypeus* is narrow and rather straight-sided, lightly punctured, but rather more strongly in front. The *pronotum* is very finely coriaceous, with minute punctures which are most distinct at the sides. The lateral margins are finely raised, the posterior angles well marked but rounded, and the basal lobe rather pointed but not long. The *elytra* are very long, smooth, scarcely perceptibly punctured, except at the sides, and rather rugose at the extremity. The outer margins are rather feebly sinuated behind the shoulders, the inner margins (at least at the posterior half) strongly raised, and the apical margins a little excised beside the apical angle, which is produced. The *pygidium* is very short, broad and transversely carinated, with its surface strigose. The lower surface of the body is very smooth, but the sides of the *metasternum* are very finely and densely punctured.

The club of the antenna is longer than the footstalk in both sexes and considerably longer in the male, although varying greatly. In the latter sex the sides of the pronotum are more divergent behind, the last abdominal segment is deeply emarginate in the middle and the ventral part of the pygidium correspondingly lobed.

Length 36-46 mm.; *breadth* 15-22 mm.

CEYLON; MADRAS: Travancore; BOMBAY; ASSAM: Silhet; TENASSERIM; ANDAMAN IS.; MALAY PENINSULA; SUMATRA; BORNEO; CHINA; etc.

Type not traced; type of *chinensis* in the British Museum, those of *gagates* and *withilli* in the Oxford Museum; the type of *nigrita* was originally in the British Museum, but cannot now be found; that of *samson* in coll. Oberthür.

This common insect is remarkably inconstant in size, colour, sculpture, etc., and tends to produce local races. The var. *samson* is a large form with the marginal line of the pronotum incomplete, the clypeus as broad as it is long, with the sides gently curved, and the pygidium smooth in the middle. It is doubtful if these features are more than individual aberrations.

The beetle is commonly found in the neighbourhood of Screw-pines (*Pandanus*) and Mr. H. N. Ridley tells me he has never seen them elsewhere than upon or flying round these. He has found them very destructive to ornamental *Pandanus* shrubs

growing in tubs at Singapore, the woody stems being tunnelled through just below the point of origin of the branches, causing them to die off. In one of the cavities so formed, Mr. Ridley found a cocoon containing a specimen of *Agestrata orichalcea*, so that the responsibility of its larva seems to be established. The larvæ were found by the late Col. C. T. Bingham at *Pandanus* roots in Tenasserim and recently emerged beetles were crawling upon the aerial roots. One of the larvæ was the prey of a larva of the great parasitic Wasp, *Scolia* (*Triscolia*) *rubiginosa*, Fab., and it may be assumed that this species is the exclusive food of that parasite.

Genus THAUMASTOPEUS.

Thamnastopeos, *Kraatz, Deutsche Ent. Zeitschr.* 1883, p. 28.
Thaumastopeus, *Kraatz, D. E. Z.* xxix, 1885, p. 350 (emend.).
Thaumastopæus, *Heller, D. E. Z.* 1899, p. 353.

TYPE, *Lomaptera mohnikei*, Thoms. (Java).

Range. Tropical Asia.

Elongate and very flat, smooth, shining and naked. Clypeus long and very deeply cleft, with sharp angles. Pronotum rather broad, with the posterior margin transverse at the sides and in the middle produced into a strong lobe, almost concealing the scutellum; the posterior angles sharp and a little produced, covering the mesosternal epimera. Scutellum long and very acute at the apex, with the sides concave. Elytra scarcely sinuated laterally, with the outer margins rather abruptly deflexed all round except at the apical angles. Pygidium short and broad, tumid, and inflexed beneath. Sternal process long and slender, the meso-metasternal suture entirely obliterated. Legs moderately long, the front tibia armed with three sharp teeth, the middle and hind tibiæ acutely digitate at the extremities. Outer lobe of mandible short, not strong. Maxilla rather long, densely hairy. Mentum not long, strongly bilobed, the lobes very divergent.

Key to the Species.

1 (6) Mesosternal process not tuberculate at the base.	
2 (5) Pygidium moderately striated.	
3 (4) Pronotum strigose at the sides	*pullus*, Billb., p. 195.
4 (3) Pronotum punctured at the sides	*nicobaricus*, Jans., p. 196.
5 (2) Pygidium extremely densely and deeply striated..................	*ceylonicus*, v.d. Poll, p. 196.
6 (1) Mesosternal process tuberculate at the base	*pugnator*, Hell., p. 197.

Lomaptera luctuosa, Thoms., described as an Indian species, I have found by examination of the type, lent me by M. René Oberthür, to be a species from Timor, *Thaumastopeus timoriensis*, Wall.

174. **Thaumastopeus pullus.**

Cetonia nigrita, *Fröhlich* (nec *Fab.*), *Naturf. Gesells. Halle*, xxvi, 1792, p. 110; xxix, 1802, p. 114, pl. 3, fig. 5; *Heller*, *Deutsche Ent. Zeitschr.* 1899, p. 355.
Cetonia pulla, *Billberg*, *Schönh. Syn. Insect.* i, 3, 1817, *App.*, p. 46; *Schaum*, *Ann. Soc. Ent. France*, 1849, p. 261.
Cetonia anthracina, *Wied.*,* *Zool. Mag.* ii, 1, 1823, p. 83.
Lomaptera viridiænea, *G. & P.*,* *Monogr. Cet.* 1833, p. 309, pl. 60, fig. 5.
Taumastopeus simillimus, *Schoch*,* *Mitth. Schweiz. ent. Ges.* x, 1898, p. 157.
Lomaptera ebena, *Burm.*, *Handb. Ent.* iii, 1842, p. 315.

Shining black, more or less tinged with blue, metallic green or copper.

Very elongate, flat above, straight-sided and slightly tapering from shoulders to apex. The *clypeus* is strongly rounded at the sides, contracted before the eyes, deeply cleft, and rugosely punctured on each side of the middle. The *pronotum* is unpunctured, except at the sides, which are more or less closely striated in an oblique direction; the lateral edges are strongly margined, angulate at the middle and sinuated behind, the posterior angles are sharp and the basal lobe long and bluntly pointed, with a slight longitudinal impression at the extreme tip. The *elytra* are quite smooth at the inner part, rather finely rugose at the sides and apices, and sometimes have incomplete longitudinal lines of punctures at the outer part of the disc. The sutural margins are elevated at the posterior part and the apical margins separately rounded. The *pygidium* is moderately finely and transversely strigose but not opaque, and feebly impressed in the middle, and the *metasternum* and *abdomen* are very smooth in the middle and rather thinly punctured at the sides. The *sternal process* is slender and curved.

The two sexes are almost indistinguishable, but the male has a slight vestige of a ventral groove, the hind tarsi are a little longer relatively than those of the female, and the tibial spurs a little sharper.

Length 18–28 mm.; *breadth* 8·5–14 mm.

Punjab: Kangra Valley; W. Bengal: Chapra, Nowatoli, Palkot; Assam: Naga Hills, Manipur; Bhutan: Maria Basti; Sikkim: Karsiang, Darjiling; Tenasserim; Andaman Is.; Ceylon; Malay Peninsula; Java; etc.

The *types* of Billberg and Fröhlich cannot be traced, that of *anthracina* is in the Copenhagen Museum, that of *viridiænea* in the Oxford Museum, that of *simillimus* in the Zurich Polyteknicum.

In spite of its abundance and familiarity I have not been able to obtain any information as to the habits or life-history of this insect. As is commonly the case with animals which are abundant and distributed over a very wide extent of country it is exceedingly inconstant in its external features and it is difficult, and perhaps

impossible, to define its specific limits satisfactorily. Such common and far-ranging forms tend in particular localities, where they have become to any extent cut off from the main body, to produce geographical races, more or less definitely characterised according to the degree of isolation. The determination whether in such cases a particular form should be called a species or a variety is an arbitrary one and differences of opinion are to be expected. In the present case several such forms may perhaps be distinguished within the Indian area, but larger and more thoroughly representative collections must be brought together before they can be properly studied. Although I have examined some hundreds of specimens they represent only a very minute portion of the total area of distribution. It is perhaps worthy of notice that in the Northern part of that area the elytra have generally distinct rows of punctures upon the disc, while in the Southern part these are absent (var. *viridiæneus*). In some specimens the corrugations at the sides of the pronotum become almost resolved into detached punctures as in the form next described, but as I have seen no completely transitional examples I have treated the latter as a distinct species.

175. **Thaumastopeus nicobaricus.**

Lomaptera nicobarica, *Janson, Cist. Ent.* ii, 1877, p. 249.

Black or very deep blue-black and extremely smooth and shining. The form is very much like that of *T. pullus*, but is a little broader, more rounded at the sides and more convex above. The *pronotum* is distinctly convex, less narrowed in front, and coarsely and not very closely punctured at the sides, without trace of striation. The *elytra* are rather shorter, less straight-sided, less flattened above and without any lines of punctures. In other respects this is exactly like the preceding species.

Length 23–27 mm.; *breadth* 12–15 mm.

NICOBAR Is.

Type in coll. Janson.

176. **Thaumastopeus ceylonicus.**

Thaumastopeus ceylonicus, *v. d. Poll*,* *Notes Leyd. Mus.* xiii, 1891, p. 185.

Black, very smooth, shining and naked, elongate but not very narrow. The *pronotum* is not very convex, coarsely, not strigosely, punctured at the sides, with the lateral margins distinctly angulated in the middle, and the posterior lobe not very narrow and without a longitudinal impression at the apex. The *elytra* bear several well-marked rows of coarse irregular punctures and are transversely strigose at the sides and apices. The *pygidium* bears two slight conical prominences and is very finely, deeply and densely strigose, rendering it opaque. The *metasternum* and

abdomen are very smooth in the middle and very strongly and irregularly punctured at the sides.

♂. The upper and lower surfaces are much less strongly sculptured and the hind tarsi longer. The abdomen is not impressed beneath.

Length 26–29 mm.; *breadth* 12–14 mm.

CEYLON: Colombo, Belihul Oya (*J. Z. Kannegieter*).

Type in coll. O. E. Janson.

Only a single male and three female examples of this species are known. It bears the closest resemblance to *T. pullus*, but can be readily distinguished by a careful comparison. It is broader and much more strongly sculptured and the striation of the pygidium is so dense as to produce a sooty unreflecting surface. The lobe of the pronotum is rather less narrow and without a longitudinal impression at its extremity. A further distinction may be found in the different form of the genitalia of the male.

177. Thaumastopeus pugnator.

Thaumastopæus pugnator, *Heller, Deutsche Ent. Zeitschr.* 1899, p. 362.
Lomaptera striata, *Wallace* (part.), *Trans. Ent. Soc. Lond.* (3) iv, 1868, p. 535.

Bright metallic green above and below, and very smooth and shining. It is large, moderately elongate, depressed above and straight-sided. The *clypeus* is very coarsely punctured, with the margins raised, and the *vertex* is smooth in the middle. The *pronotum* is rather coriaceous and extremely finely punctured, except in the region of the front angles, where the punctures are very coarse. The sides are contracted in front, where they are considerably depressed, obtusely angulated at the middle, and produced outwards at the hind angles, which are sharp. The basal lobe is minutely rounded at its apex. The *elytra* have a few very minute and inconspicuous punctures, which are a little more apparent at the sides, and the apical and posterior lateral margins are feebly rugose; the outer edges are scarcely sinuated and the apices are excised near the angles, which are spinose. The *pygidium* is strigose, the *metasternum* coarsely transversely punctured at the sides, and each ventral segment has a median line of setigerous punctures, except the last, which is entirely punctured. The *mesosternal process* is strong, curved and

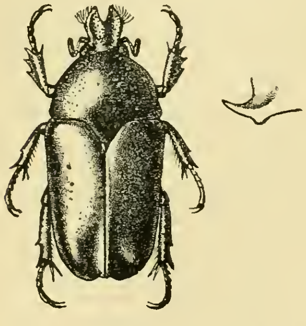

Fig. 43.—*Thaumastopeus pugnator* (natural size), and detail of sternal process in profile.

rather sharp, and bears at its base a strong conical, rather compressed, elevation. The *front tibia* is armed with three stout and sharp teeth.

I have only seen a single female specimen which is in the British Museum.

Length 32 mm.; *breadth* 15·5 mm.

Burma; Penang and Sumatra (*teste* Dr. Heller).

Type in Dresden Museum.

Division I.—Section 2. CREMASTOCHILINA.

This group is very closely related to the previous division of the Cetoniini, but in response to a different manner of life its members have to a great extent lost the characteristic aspect of the Subfamily. They are very various in form but generally sombre-coloured and possessing well-marked peculiarities in their mouth structure. They are not, like the great majority of the insects previously dealt with, flower frequenters and suctorial, but in general are nocturnal and occur under stones and in similar situations, many of them being inmates of the nests of Ants or Termites. The actual nature of their food is unknown but it is evidently of a solid nature, the organs of the mouth being adapted for biting and without brushes of soft hairs.

The mandibles are no longer thin and blunt externally but strongly chitinised, with the extremities strong, sharp and directed towards each other, and the internal membranes are much reduced. The maxillæ end in two or three strong sharp teeth and are clothed only with stiff bristles: the palpi have the basal joints very small and the terminal one rather large. The mentum is broad and rather smooth, not at all or but little emarginate at the front margin and generally tumid beneath, its palpus having the basal joints minute and the terminal one rather large. The basal joint of the antenna is generally enlarged. The mesosternal epimera are enlarged and reach the dorsal surface: and the scutellum is extremely sharp at the apex with its sides concave. The outer margins of the elytra are generally strongly sinuated behind the shoulders. The last pair of spiracles is frequently situated upon tubercular prominences, and sometimes the preceding one or two pairs also. The mesosternal process is absent or rudimentary. The front tibiæ are usually bidentate, and the front tarsi in the most characteristic genera are inserted so far back as to appear when seen from above to consist of only three or four joints.

The male is furnished with long branched antlers in *Goliathopsis* and with pads of hair upon the hind tibiæ in certain species of *Cœnochilus*. In most, the abdomen is arched or excavated beneath in this sex.

In spite of their typically dull colouring, bright coloured species are found in the genus *Macroma*, and *Spilophorus* has white patches

which reproduce the markings of species of *Protætia*. Again, while some have the legs long, there are others in which the tarsi are contracted to such an extent as to consist of only four visible joints (genus *Callinomes*).

Owing to their aberrant structure these forms are generally regarded as constituting a group of higher rank than the groups of Cetoniini, but the inquilines of Ants and Termites in very different tribes of beetles are subject to certain profound modifications which tend to obscure their real affinities and suggest relationships which are only apparent. It is possible that the homogeneity of the Cremastochilina may to some extent be due to convergence brought about by similarity of environment. Westwood considered the group to be most nearly related to *Diplognatha* and *Protætia*, and *Macroma* as forming a link with those genera; but in my opinion the point of contact is to be found rather with the Oxythyreides, through such genera as *Spilophorus* and *Cymophorus*, and *Macroma* is rather an isolated form.

Table of the Genera.

1	(6)	Base of pronotum sharply excised before the scutellum.	
2	(5)	Terminal spiracles slightly elevated, not spinose.	
3	(4)	Pygidium protuberant..............	Platysodes, p. 199.
4	(3)	Pygidium vertical	Spilophorus, p. 201.
5	(2)	Terminal spiracles sharply spinose....	Cymophorus, p. 203.
6	(1)	Base of pronotum not sharply excised before the scutellum.	
7	(14)	Body not very compact: prothorax not very broad at base.	
8	(13)	Tarsi 5-jointed.	
9	(12)	Body clothed with variegated tomentum.	[p. 204.
10	(11)	Head flat	Parapilinurgus.
11	(10)	Head concave behind (♂ horned)....	Goliathopsis, p. 205.
12	(9)	Body naked, black or very dark red ..	Cœnochilus, p. 206.
13	(8)	Tarsi 4-jointed	Callinomes, p. 215.
14	(7)	Body very compact: prothorax very broad at base	Macroma, p. 217.

Genus **PLATYSODES.**

Platysodes, *Westw., Thes. Ent. Oxon.* 1874, p. 23.

Type, *Platysodes verloreni*, Westw. (Java).

Range. Java and Assam.

Very flat above, moderately elongate and very smooth, bare and shining above and beneath. Head broad and clypeus short, with a straight, reflexed front margin. Prothorax very transverse, with the base excised in the middle. Elytra rather broad at the shoulders, slightly sinuated between them and narrow at the

extremities. Pygidium prominent, sharply carinate all round, with the upper and lower faces nearly flat. Last pair of spiracles prominent. Prosternum with a strong vertical process in front of the coxæ; metasternum forming a narrow carina between the middle coxæ but not produced forward. Front tibia rather short, armed with two slight external teeth, not closely approximate: four posterior tibiæ acutely digitate at the extremity and each armed with a strong spine at the middle of the outer edge. Tarsi not long, nor closely articulated. Basal joint of antenna not very large. Mentum large, rather smooth and nearly flat.

The following species is only the second assigned to the genus.

178. **Platysodes jansoni**, sp. n.

Jet-black, very smooth and shining. The body is flat and long, tapering slightly behind. The *head* is broad, with the eyes not very large or prominent, and the *clypeus* short, rounded at the sides and straight at the front margin, which is distinctly reflexed. There are two shallow, punctured depressions between the antennal orbits. The *pronotum* is half as broad again as it is long, strongly rounded at the sides, with the posterior angles obliterated and the base distinctly excised before the scutellum. The *elytra* are rather broader at the shoulders than the prothorax, gently sinuated at the lateral margins and roundly narrowed to their extremities. There is a narrow depression at the anterior part of the suture, the latter is bordered on each side by a deep stria, and there is a very strong lateral furrow on each elytron, not reaching the front or hind margin. The intervening space is smooth and bears only a few very minute punctures. The *pygidium* is almost semicircular in shape and has a strong carina all round, which divides it into nearly equal dorsal and ventral faces. These are thinly and rather minutely punctured and the dorsal surface is opaque and gently carinate longitudinally in the middle. The *metasternum* and *abdomen* are smooth in the middle and feebly rugose at the sides.

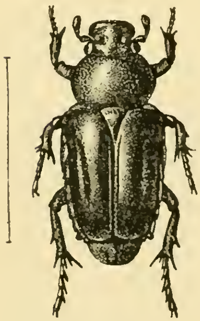

Fig. 44.
Platysodes jansoni.

The unique specimen described appears to be a male.

Length 24 mm.; *breadth* 9·5 mm.

Assam: Khasi Hills.

Type in coll. Janson.

Genus SPILOPHORUS.

Spilophorus, *Lacord, Gen. Col.* iii, 1856, p. 545; *Westw., Thes. Ent. Oxon.* 1874, p. 28.
Centrognathus, *Burm.* (nec *Guérin*), *Handb. Ent.* iii, 1842, p. 652.
Pseudospilophorus, *Kraatz, Deutsche Ent. Zeitschr.* 1899, p. 68.—Type *Cremastochilus maculatus*, G. & P.

Type, *Spilophorus plagosus*, Westw. (Africa).
Range. Africa and India.

Form rather depressed, broad and parallel-sided, with short legs. Clypeus short and broad; the eyes prominent. Prothorax broadly transverse, contracted in front and strongly emarginate in front of the scutellum. Scutellum large, not long but very acute. Elytra strongly sinuated behind the shoulders. Mesosternum not produced. Front tibia feebly bidentate; middle and hind tibiæ strongly toothed at the middle of the outer margin and digitate at the end. All the tarsi short and compact. Mentum broad in front and feebly emarginate. Maxillary lobes forming two very strong teeth. Mandible with a strong hooked tooth at the end. Last pair of abdominal spiracles elevated.

♂. The abdomen is hollowed beneath.

According to Mr. Péringuey, *Spilophorus* lives in South Africa in the nests of Passerine birds, where both the larva and adult feed upon the nest-material or excrement. The black and white colouring of all the species appears to be a protective assimilation to such an environment, but if the same habit prevails in India it is not invariable, for one of the two species has been found in an Ants' nest.

Regarding the two Indian species (hitherto treated as one) as constituting the type of Westwood's genus, Dr. Kraatz made a new genus for the African forms. This is based on very slight grounds, and since the anatomical details described and figured by Westwood are those of the African and not the Indian species, I consider it incorrect to treat the latter as his type. The confusion of the two Indian species is a further objection to this.

Key to the Species.

Hind angles of the prothorax not distinct. .	*maculatus*, G. & P., p. 202.
Hind angles of the prothorax sharp	*cretosus*, Hope, p. 201.

179. Spilophorus cretosus.

Cetonia cretosa, *Hope, Trans. Zool. Soc. Lond.* i, 1835, p. 98.
Spilophorus maculatus, *Kraatz* (nec *G. & P.*), *Deutsche Ent. Zeitschr.* 1899, p. 62.

Black and shining above and beneath, with white markings distributed as follows:—a large patch on each side of the pronotum, wider in the anterior part, where it usually encloses a minute black spot, and a minute spot near the base on each side, a humeral

spot, a large ragged patch at the middle of the outer margin of each elytron, several minute spots near the suture and an irregular apical mark, and large irregular patches on each side of the pygidium, sternum and abdomen.

Fig. 45. — *Spilophorus cretosus. a.* Hind angle of prothorax.

The *head* is closely punctured and the *pronotum* rather finely and sparingly, with the sides strongly convergent in front and nearly parallel behind, the hind angles sharp and slightly produced backwards, the base being broadly and deeply excised in the middle. The *scutellum* bears a few punctures at the sides. The *elytra* are a little depressed behind the scutellum and bear a few very large and irregular punctures. The *pygidium* has a sharp median carina and is coarsely and rather closely pitted. The sides of the *metasternum* and *abdomen* are coarsely punctured.

Length 15–17 mm.; *breadth* 8–10 mm.

BENGAL: Maldah, Berhampur; BOMBAY: Malegaon; CEYLON: Western Prov. (Colombo Mus.).

Type unknown—formerly in coll. Sykes.

Three specimens of this species were found in the nest of a black ant (*Cremastogaster*) at Malegaon, according to Mr. H. Maxwell Lefroy.

180. Spilophorus maculatus.

Cremastochilus maculatus, *G. & P.**, *Monogr. Cet.* 1833, p. 119, pl. 16, fig. 8; *Westw., Thes. Ent. Oxon.* 1874, p. 29.
Spilophorus bangalorensis, *Kraatz,* Deutsche Ent. Zeitschr.* 1899, p. 63.

Shining black above and beneath, and decorated with white markings as in *S. cretosus*, Hope.

The form is narrower than that of the preceding species. The *head* is closely punctured and the *pronotum* very coarsely but not closely so. The lateral margins of the latter are curved and slightly angulated in the middle and the hind angles are very blunt. The *scutellum* bears a few punctures at the sides, and the *elytra* are very coarsely and irregularly pitted and a little depressed behind the scutellum. The *pygidium* has a slight median carina and is coarsely punctured. The *metasternum* and *abdomen* are strongly but sparsely punctured all over.

Length 13 mm.; *breadth* 7 mm.

MADRAS: Bangalore.

Type in the Oxford Museum: that of *bangalorensis* in the German Entomological National Museum.

Genus CYMOPHORUS.

Cymophorus, *Kirby, Zool. Journ.* iii, 1827, p. 271; *Westw., Thes. Ent. Oxon.* 1874, p. 16.

Ptychophorus, *Schaum, Germar's Zeitschr.* iii, 1841, p. 271; *Lacord., Gen. Col.* iii, 1856, p. 544.

TYPE, *Cymophorus undatus*, Kirby (S. Africa).

Range. Africa, India, Indo-China.

Small, compact, elongate, and more or less clothed with hairs or setæ. Clypeus short and broad, with the front margin straight and reflexed. Eyes very prominent. Basal joint of antenna not large. Prothorax transverse, broadly emarginate before the scutellum. Last pair of spiracles very prominent, spinose. Mesosternum very narrow between the middle coxæ and scarcely produced, forming a right-angled lamina. Legs of moderate length, the front tibia rather slender and armed with two equal blunt teeth placed close together at the extremity. Tarsi 5-jointed and slender.

The species here described is the first discovered in non-African localities. The chief home of the genus is Southern Africa, where the species are rather numerous.

181. **Cymophorus pulchellus**, sp. n. (Plate II, fig. 5.)

Shining black, with two large bright red patches upon each elytron, placed one before the middle and the other behind it, approximately quadrate in shape and touching the outer margins, where they are united by a narrow band.

The body is long, narrow and parallel-sided, clothed with short, coarse, silvery setæ upon the head, the front and sides of the pronotum, the shoulders, the pygidium and the lower surface (except along the middle). The *head* is entirely rugose and the *pronotum* strongly and coarsely punctured—less closely upon the posterior half. It is distinctly broader than it is long, the sides are strongly contracted towards the front and slightly towards the hind margin, which is approximately straight, with the angles distinct but obtuse and the middle broadly excised. There is a large deep pit close to the hind margin on each side. The *scutellum* is very smooth, and the *elytra* are strongly punctured at the front, lateral and hind margins, and have besides a few irregular longitudinal rows of punctures. There is a punctured pit near each shoulder, a longitudinal depression, containing several fine striæ, near the sutural margin, and a transverse impression at the middle of each elytron occupying the space between the two red patches. The sides of the elytra are prominent at the shoulders, strongly sinuated behind them and rounded at the extremity. The *pygidium* is large, triangular, and rather closely hairy. The middle of the *metasternum* and *abdomen* are smooth and shining, and the sides hairy. The last two ventral segments are bent downwards. The *front tibia* is bent outwards at the extremity and terminates in two very closely approximate teeth.

♂. The abdomen is narrowly channelled beneath and the hind tibia bears a rather long fringe of hairs within.

♀. The outer spur of the middle tibia and both spurs of the hind tibia are long and strongly curved, but not very sharp. The hind tarsus is shorter than that of the male.

Length 9 mm.; *breadth* 4 mm.

W. Bengal: Chota Nagpur (*R. P. Cardon*), Chandanagar.

Type ♂ in the British Museum; ♀ in coll. Janson; co-types in coll. Oberthür.

Genus **PARAPILINURGUS**, nov.

Type, *Parapilinurgus variegatus*, sp. n.

Range. That of the species following.

Body rather short, with the elytra much broader than the prothorax, and the whole body clothed with opaque earthy matter. Head small, with prominent eyes, and clypeus broad, with the anterior margin very strongly reflexed. Prothorax rather small, strongly narrowed in front and regularly rounded at the sides and base. Elytra rather parallel-sided, strongly sinuated behind the shoulders. Pygidium nearly vertical, scarcely convex. Terminal spiracles scarcely elevated. Mesosternum narrow and not prominent between the coxæ. Legs slender, the front tibiæ minutely and sharply bidentate, the middle and hind tibiæ sharply digitate at the end and armed with a strong spine at the middle of the outer edge. Tarsi five-jointed. Basal joint of antenna not much enlarged, club rather large. Mentum tumid beneath, with the anterior part flattened and the front margin broad and feebly notched in the middle. Maxilla short and stout, with its outer lobe forming a strong, but not acute, tooth. Last joint of all the palpi long. Mandible armed with a short triangular tooth.

This new genus is very near the African *Pilinurgus*, from which it differs by its peculiar shape, narrow in front and broad behind, the very slight antecoxal process of the prosternum, scarcely elevated terminal spiracles and not-concave mentum.

182. **Parapilinurgus variegatus**, sp. n.

Black, clothed above and beneath with a brown earthy matter, irregularly speckled with pale markings, among which a slight transverse angulate mark is distinguishable behind the middle of each elytron. The surface is coarsely, shallowly and rugosely punctured.

The form is short, with the elytra broad and flattened and the prothorax narrow. The *head* is rugose and the clypeal margin entire and very strongly reflexed. The *pronotum* is much narrower than the elytra, about as long as it is broad, not very convex, strongly narrowed anteriorly, with the front angles acute, the

sides and base being strongly and continuously rounded. The *elytra* are broad at the shoulders, with the sides strongly sinuated and almost parallel from the sinuation to the extremity.

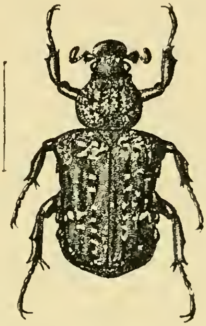

Fig. 46.—*Parapilinurgus variegatus.*

Length 14·5 mm.; *breadth* 7·5 mm.

BURMA: Karen Hills; TONKIN: Doug Van.

Type in the British Museum.

A single specimen was found by the late W. Doherty in Burma, and a specimen in M. René Oberthür's collection was taken by Capt. Gadel in Tonkin.

Genus **GOLIATHOPSIS.**

Goliathopsis, *Janson, Cist. Ent.* ii, 1881, p. 609.

TYPE, *Pilinurgus despectus*, Westw.

Range. Burma, Siam and Tonkin.

Rather short in form, with the shoulders prominent, and not appreciably narrowing behind, clothed above and beneath with an opaque bloom or tomentum. Clypeus semicircular, with the margin recurved. Prothorax strongly transverse, with the basal margin uniformly rounded, not produced or excised in the middle. Scutellum short, broad in front and extremely acute at the apex. Elytra deeply excised externally. Pygidium vertical. Last pair of spiracles prominent. Middle coxæ contiguous. Legs moderately long; front tibiæ sharply bidentate; four posterior tibiæ acutely digitate at the ends; tarsi slender. Mandible stout, with the terminal tooth sharp and nearly straight, and the internal membrane well developed. Maxilla short, armed with three blunt teeth. Mentum very tumid beneath, with the front margin straight.

♂. Head furnished with a pair of branched horns arising from above the eyes. First four ventral segments contracted in the middle, and the last two enlarged and smooth.

Two species of this remarkable genus have been discovered, the typical one occurring within our boundaries.

183. **Goliathopsis despectus.** (Plate II, figs. 2 & 3.)

Pilinurgus despectus, *Westw.**, *Thes. Ent. Oxon.* 1874, p. 32, pl. ix, fig. 3.
♂. Goliathopsis cervus, *Janson,* Cist. Ent.* vol. ii, 1881, p. 610, pl. 11, ff. 4 & 5 (n. syn.).
Goliathopsis capreolus, *Gestro,* Ann. Mus. Genova,* (2) vi, 1888, p. 118, fig. (n. syn.).

Black, with a velvety clothing, olive-brown above and yellowish-grey beneath, decorated with a pale median line upon the pronotum and scutellum, and two small lateral spots, an intermediate sutural one and an apical patch upon each elytron. The head, prothorax and abdomen are moderately, and the elytra very sparsely, clothed with minute erect setæ.

The *head* is a little hollowed above, and the *clypeus* smooth and black. The *prothorax* is strongly curved at the sides and gently rounded at the base, with the hind angles scarcely perceptible. The *elytra* are flat, slightly and rather irregularly punctured, and separately rounded at the extremity. The *pygidium* is very coarsely punctured, slightly depressed on each side, bare at the apex, and the *metasternum* and sides of the *abdomen* beneath are also very coarsely punctured.

♂. The cephalic horns are parallel or slightly divergent, curving upwards and forwards, blunt at the end, with a short exterior branch beyond the middle.

♀. The horns are represented by slight prominences above the eyes.

Length 12 mm.; *breadth* 6 mm.

TENASSERIM: Moulmein (*L. Fea*); SIAM.

Type in the British Museum; type of *cervus* in coll. O. E. Janson, and of *capreolus* in the Genoa Museum.

This species was found by Fea in May 1887, upon flowering bushes.

Genus **CŒNOCHILUS.**

Cœnochilus, *Schaum, Germar's Zeitschrift,* 1841, p. 268; *Westw., Thes. Ent. Oxon.* 1874, p. 34; *Lacord., Gen. Col.* iii, 1856, p. 547.

TYPE, *Cetonia maura*, F. (W. Africa).

Range. The Oriental and Ethiopian Regions.

Very elongate and more or less narrow-waisted, the prothorax not being closely articulated to the mesothorax. Clypeus broadly dilated in front, with rounded angles. Pronotum subcircular or hexagonal, without sharp angles, and generally about as long as it is broad. Elytra unevenly costate or striate, with the lateral margins strongly excised behind the shoulders. Pygidium generally prominent and convex. Prosternum armed with a rather

slender antecoxal process. Mesosternum not produced. Last pair of spiracles, and sometimes one or two pairs immediately preceding, situated upon prominent tubercles. Front tibia armed with two teeth placed close together at the extremity. Tarsi slender (except in *C. curtipes* and *taprobanicus*, in which they are thick and compact), five-jointed, with the basal joint short. In the front legs the first two joints are concealed, as seen from above, by the anterior prolongation of the tibia. Basal joint of antenna very large and triangular, the footstalk very short and compact. Mandibles moderately strong and sharp. Maxillary lobes forming two collateral pairs of extremely sharp and slender teeth. Mentum vertical in front and very broad, completely concealing the labial palpi.

♂. The abdomen is arched and sometimes deeply excavated. In certain species there are also brush-bearing appendages at the inside of each of the hind tibiæ.

Mr. T. R. D. Bell has found specimens of this genus in the arboreal nests of a species of Ant.

Key to the Species.

1 (14)	Not, or little, constricted at the waist; last spiracle alone prominent.	
2 (13)	Front tibia moderately slender, bidentate.	
3 (12)	Upper surface shining, not closely sculptured.	
4 (11)	Dorsal part of elytra smooth.	
5 (10)	Pronotum strongly punctured.	
6 (7)	Head closely punctured with a sharp tubercle between the eyes	*gracilipes*, Moser, p. 208.
7 (6)	Head coarsely rugose, with a transverse ridge between the eyes.	
8 (9)	Pronotum widest behind the middle.	*brunneus*, Saund., p. 208.
9 (8)	Pronotum widest before the middle .	*solidus*, sp. n., p. 209.
10 (5)	Pronotum very finely punctured	*nitidus*, sp. n., p. 210.
11 (4)	Dorsal part of elytra in part finely rugose	*acutipes*, sp. n., p. 210.
12 (3)	Upper surface closely sculptured....	*pygidialis*, Janson, p. 211.
13 (2)	Front tibia very stout, with a 3rd tooth near the base	*trabecula*, Schaum, p. 212.
14 (1)	Much constricted at the waist; two or three spiracles prominent on each side.	
15 (18)	Legs moderately long.	
16 (17)	Metasternum rugose	*campbelli*, Saund., p. 212.
17 (16)	Metasternum with horseshoe-shaped impressions	*taprobanicus*, Westw., [p. 213.
18 (15)	Legs very short and stout	*curtipes*, Westw., p. 213.

"*Pilinurgus*" *leveillei*, Nonfried, is evidently a species of the genus *Cœnochilus*, but I am not able to identify it.

184. Cœnochilus gracilipes.

Cœnochilus gracilipes, *Moser, Deutsche Ent. Zeitschr.* 1910, p. 300.

Black and shining, with the sides of the metasternum and the pygidium and sides of the abdomen beneath more thinly clothed with tawny hair.

It is a small and only moderately elongate species, with the prothorax rather small and the shoulders very prominent. The *head* is closely and coarsely punctured, with the *clypeus* dilated to the front margin and feebly bilobed, and the vertex less coarsely punctured and bearing a slight but sharp median tubercle between the eyes. The *pronotum* is small, transverse, strongly and uniformly punctured, with the sides strongly but bluntly angulated at the middle, the hind angles rather sharp and prominent, and the base broad and nearly straight. There is an impressed median line upon the posterior half, and a small basal pit near each hind angle. The *scutellum* bears a few punctures. The *elytra* bear each three smooth longitudinal costæ, a little punctured towards the posterior end; the intervals bear rows of crescentic punctures, which become simple and irregularly scattered towards the base. The sides and apices are strigose. The shoulders are very prominent and there is a profound marginal sinuation behind each. The *pygidium* is strongly and deeply punctured and clothed with tawny hair. The *lower surface* is smooth along the middle line, punctured and hairy at the sides, those of the metasternum rather closely. The terminal spiracles are very prominent and sharp. The *legs* are rather slender, but the front tibiæ are moderately broad, armed with two sharp teeth at the extremity and a vestige of an upper one near the middle.

♂. The abdomen is longitudinally channelled beneath.

Length 12 mm.; *breadth* 5 mm.

Assam: Naga Hills (*Coll. Godwin-Austen*), Khasi Hills (*Moser Coll.*).

Type in coll. Moser.

This description is drawn up from a single male specimen, badly preserved, in the Calcutta Museum. In this example the abdomen and pygidium are reddish. The species is closely related to *C. striatus*, Westw., from Hong Kong, in which the sides of the body have an opaque grey bloom beneath, instead of being clothed with hair.

185. Cœnochilus brunneus.

Cœnochilus brunneus, *Saunders*,* *Trans. Ent. Soc. Lond.* iii, 1842, p. 235, pl. xiii, fig. 2; ♂, *Westw., Thes. Ent. Oxon.* 1874, p. 45, pl. xiii, fig. 3.

Black or reddish black, smooth and shining, with the metasternum and pygidium clothed with very short silky yellowish

hairs, and the legs slender. The *head* is moderately punctured, with the eyes large and prominent and the front margin of the clypeus broad and feebly excised. The *pronotum* is subcircular, with the angles obliterated and the sides strongly and evenly curved, but more strongly approximating in front. The disc is convex, with scattered punctures, which are stronger and denser in the anterior part, a fine impressed longitudinal line in the middle and a large impression at each side of the base. The *scutellum* is finely, rather rugosely, punctured. The *elytra* are not very long, broad at the base and narrowing towards the apex; they are scarcely punctured, except at the base, but there are four broad and deep longitudinal sulci upon each, the outermost finely rugose in its posterior part. The *pygidium* is finely punctured and pubescent, and the last spiracle on each side is elevated. The *abdomen* is smooth in the middle. The *legs* are long and the *front tibiæ* rather sharply bidentate.

♂. The abdomen is strongly arched and deeply and broadly excavated in the middle. The apical half of the hind tibia is furnished inside with a ridge bearing close-set yellowish setæ.

Length 15 mm.; *breadth* 6 mm.

W. Bengal: Chota Nagpur, Nowatoli; Bombay: Belgaum; Mysore: Shimoga.

Type ♀ in coll. R. Oberthür; the ♂, first described by Westwood, is in the Oxford Museum.

The name given to this species is unfortunate, for normal specimens are jet-black.

186. Cœnochilus solidus, sp. n.

Black and shining, with the metasternum thickly clothed with a velvety yellow pubescence, and the head, pygidium and sides of the abdomen more finely and inconspicuously clothed. The body is robustly built, elongate and parallel-sided, with the tibiæ not long but the tarsi slender. The *head* is coarsely rugose and the *pronotum* strongly punctured all over, but more strongly and closely upon the anterior half. It is subcircular, with the base very short, the hind angles completely obliterated and the sides not regularly curved, but rather abruptly widened before the middle. There is a median longitudinal channel from before the middle to the base and a deep impression at each end of the base. The *scutellum* is rather finely strigose. The *elytra* are not sloping at the shoulders nor tapered to the extremities, but are strongly sinuated at the outer margins, deeply striated, distinctly but thinly punctured on the dorsal part, and finely and closely rugose at the sides and apices and in the third stria. The *pygidium* is finely striated concentrically and the *abdomen* transversely strigose.

♂. The abdomen is deeply excavated in the middle, the front tibiæ bluntly bidentate at the end, and the hind tibiæ feebly dilated and fringed at the inner edge of the posterior half.

♀. The front tibia is short and broad and armed with two very stout but blunt teeth.

Length 19 mm.; *breadth* 8 mm.

BHUTAN: Pedong.

Type (♀) in the British Museum; ♂ in coll. R. Oberthür.

This species has been presented to the Museum by M. Oberthür.

187. **Cœnochilus nitidus**, sp. n.

Black, smooth and very shining, with the metasternum thickly clothed with short silky yellow pubescence and the legs long and slender. The *head* is rugose, with the front margin broad and feebly emarginate, and the eyes large and prominent. The *pronotum* is hexagonal, with the angles very blunt and the base very slightly emarginate. It is convex, lightly and irregularly punctured, with a slight impressed median line, obliterated in front and deeper behind the middle, and a deep pit at each basal angle. The *scutellum* is finely and irregularly punctured, and the *elytra* are long, broad at the base and tapering slightly towards the extremities. They are punctured strongly at the base and finely at the sides, and each has four strong sulci. The *pygidium* is finely rugose; the *abdomen* smooth in the middle and finely strigose at the sides, and the last pair of spiracles is elevated. The *front tibiæ* are bluntly bidentate.

Fig. 47.
Cœnochilus nitidus, male.

♂. The abdomen is strongly arched and broadly and deeply excavated beneath, and the hind tibia has a thick pad of short yellowish setæ upon the apical half of its inner edge.

Length 17 mm.; *breadth* 7·5 mm.

BOMBAY: Kanara.

Type in the British Museum; co-type in Coll. H. E. Andrewes.

I have only seen, in addition to the type, a single specimen taken in Kanara by Mr. H. E. Andrewes.

188. **Cœnochilus acutipes**, sp. n.

Black and very shining, with the metasternum clothed with fine yellow hairs, and the legs slender. The *head* is coarsely rugose, the front margin is broad and feebly emarginate, and there are two very shallow pits between the eyes. The *pronotum* is subcircular, a little attenuated in front and not very broad at the base, with a well-marked narrow median groove and two deep pits at the basal margin. It is strongly punctured at the front and sides and finely behind and in the middle. The *scutellum* is moderately punctured. The *elytra* are rather prominent at the shoulders,

strongly sinuated behind them and tapered slightly to the extremities; they are lightly punctured in front and each has three broad longitudinal sulci (the innermost divided in front) which, as well as the posterior part of the outer margins and the apices, are finely rugose; the remaining parts of the elytra are very smooth and shining. The *pygidium* is feebly rugose and setose, with the apical part rather abruptly inturned and carinate longitudinally, and with a slight impression just before the carina. The *front tibiæ* are strongly bidentate and the upper tooth is acute. The four *posterior tibiæ* have each a sharp tooth beyond the middle of the outer edge. The middle of the *abdomen* is smooth and the sides slightly rugose and setose.

The unique type specimen, presented to the British Museum by Mr. H. Maxwell Lefroy, is a female.

Length 19 mm.; *breadth* 8 mm.

BOMBAY: Igatpuri.

Type in the British Museum.

189. Cœnochilus pygidialis.

Cœnochilus pygidialis, *Janson,* Trans. Ent. Soc. Lond.* 1901, p. 185.

Black, rather closely and uniformly clothed with reddish setæ beneath, and closely sculptured and not shining above. The body is of rather compact form, but the legs are moderately long. The *clypeus* is very deeply and coarsely rugose, and broad and gently emarginate in front. The eyes are large and prominent. The *pronotum* is strongly and closely punctured, very convex and subcircular, and a little attenuated in front. There is a lightly impressed longitudinal groove and the base is almost straight in the middle, with a marginal groove which is enlarged on each side. The *scutellum* and *elytra* are everywhere finely rugose and the latter have each three broad longitudinal furrows. The *pygidium* is very prominent, with a strong nearly straight transverse carina in the middle; the surface above the carina is nearly flat and finely rugose, and that below it convex, shining, sparingly punctured and lightly carinate longitudinally. The *front tibia* is moderately stout and ends in two very bluntly rounded teeth placed close together. The terminal spiracles are only very feebly elevated.

The unique type is a female, and the peculiar form of the pygidium is probably characteristic of that sex.

Length 17 mm.; *breadth* 7 mm.

BOMBAY: Belgaum.

Type in coll. O. E. Janson.

190. Cœnochilus trabecula.

Cœnochilus trabecula, *Schaum, Ann. Soc. Ent. France*, 1844, p. 397; *Westw., Thes. Ent. Oxon.* 1874, p. 44, pl. xiii, fig. 10.
Cremastochilus senegalensis, *G. & P., Monogr. Cet.* 1833, p. 114, pl. xv, fig. 7.

Black and shining, with very scanty minute setæ upon the upper surface and short yellowish hairs upon the pygidium and lower surface. The form is elongate, moderately compact and a little depressed above, with not very slender legs. The *head* is broad, nearly straight in front, with prominent eyes, and coarsely granulated. The *prothorax* is subcircular, rather long, narrowed in front, feebly angulated at the sides, with the base narrow but considerably wider than the apex. The dorsal surface is convex, strongly and closely punctured, and longitudinally grooved in the middle. The *scutellum* is finely punctured, and the *elytra* are coarsely and indefinitely punctured and strongly sulcate; they are not very prominent at the shoulders but taper a little towards their extremities. The *pygidium* is finely rugose and pubescent except at the apex, where it is nearly smooth and slightly carinate longitudinally. The *front tibia* is short and broad, with two very large blunt terminal teeth and a smaller very obtuse one near the base. The four *posterior tibiæ* have each a strong tooth beyond the middle of the outer edge, and the *tarsi* are moderately long.

♂. The abdomen is arched but not excavated and the spurs of the hind tibiæ are short and sharp.

♀. The spurs of the hind tibiæ are broad and blunt.

Length 12–14·5 mm.; *breadth* 5–5·5 mm.

BOMBAY; MADRAS: Malabar, Bangalore, Nilgiri Hills, Pondichery.

I have examined the insect attributed to this species by Mr. Janson in Trans. Ent. Soc. Lond. 1901, p. 184, and find that it is really a specimen of *C. brunneus*, Saund.

191. Cœnochilus campbelli.

Cœnochilus campbelli, *Saund.*,* *Trans. Ent. Soc. Lond.* iii, 1842, p. 234, pl. xiii, fig. 1; *Westw., Thes. Ent. Oxon.* 1874, p. 44, pl. xiii, fig. 5.
Cœnochilus platyrrhinus, *Schaum, Ann. Soc. Ent. France*, 1844, p. 419.

Black, moderately shining and closely punctured above, the punctures bearing minute greyish setæ, the lower surface finely strigose, and the legs long and slender. The *head* is rugose, broad, and nearly straight at the front margin, and the eyes are not prominent. The *pronotum* is convex, densely punctured, feebly grooved along the middle, hexagonal in shape, but with the lateral angles placed considerably before the middle, and with a faint pit in each hind angle. The *scutellum* and *elytra* are rather less densely

punctured and the latter rather parallel-sided, each having three costæ. The *pygidium* is finely rugose and the last three spiracles on each side of the abdomen are elevated. The *front tibia* terminates in two feeble and blunt teeth.

♂. The abdomen is strongly arched, but scarcely excavated.

Length 16–20 mm.; *breadth* 6–8 mm.

BENGAL: Maldah.

Type in coll. R. Oberthür.

192. Cœnochilus taprobanicus.

Cœnochilus taprobanicus, *Westw.*,* *Thes. Ent. Oxon.* 1874, p. 46, pl. xii, fig. 8.

Black, coarsely rugose above and below and thinly clothed with minute setæ. It is large, elongate and convex, with long but stout legs and thick, closely articulated tarsi. The *head* is coarsely rugose, with the front margin broad and trisinuate, and the eyes not very prominent. The *pronotum* is subhexagonal, with the sides angulated before the middle and the base narrow; it is convex, coarsely and rugosely punctured, and feebly sulcate longitudinally behind the middle. The *scutellum* and *elytra* are coarsely punctured, the punctures being more or less crescent-shaped and partially confluent. The elytra are long, not prominent at the shoulders nor markedly tapering behind, and broadly sulcate above. The *pygidium* is tumid and rather finely rugose, the *metasternum* closely covered with horseshoe-shaped punctures, and the *abdomen* with transverse wrinkles. The *front tibia* is moderately slender, with two stout teeth close together at the extremity, and the four *posterior tibiæ* have each a small spine considerably behind the middle. The basal joint of the *antenna* is very large and triangular. The last pair of spiracles is strongly elevated and the two preceding pairs slightly.

♂. The abdomen is slightly arched beneath and the spurs of the hind tibia are sharp.

♀. The spurs of the hind tibia are very short and broad.

Length 17–20 mm.; *breadth* 6–7·5 mm.

CEYLON: Peradeniya (*E. E. Green*); MADRAS: Shembaganur, near Madura.

Type in the British Museum.

193. Cœnochilus curtipes.

Cœnochilus curtipes, *Westw.*,* *Thes. Ent. Oxon.* 1874, p. 47, pl. xiii, fig. 6.

Black or pitchy-black, thickly punctured above and below, each puncture bearing a minute yellowish seta, the legs short and thick and the tarsi strongly contracted, with very short, nearly straight and scarcely divergent claws. The *clypeus* is very broad and trisinuate in front, and the eyes not at all prominent. The *head*

and *pronotum* are densely punctured, and the latter is hexagonal in shape, narrow at the base, convex and narrowly grooved along the middle. The *scutellum* and *elytra* are rather less densely punctured, and the latter are very sloping but not prominent at the shoulders and not tapering; they have each three longitudinal costæ. The *pygidium* is tumid and very finely and densely rugose, the *metasternum* is thickly covered with large horseshoe-shaped punctures and the *abdomen* with fine transverse wrinkles. The last pair of spiracles is strongly elevated and the two preceding pairs slightly. The *front tibia* has two very feeble teeth at the extremity, and the *posterior tibiæ* are without spines but setose like the rest of the body.

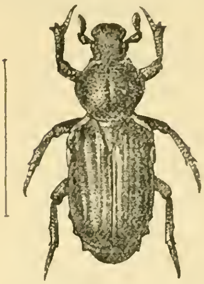

Fig. 48.
Cœnochilus curtipes.

♂. The abdomen is arched but not excavated and the spurs of the hind tibiæ are very short.

♀. The outer spur of the hind tibia is very short, broad and almost quadrate.

Length 20 mm.; *breadth* 7·5 mm.

ASSAM; BURMA.

Type in the Oxford Museum.

I have not been able to recognise the following species, and a translation of the original description is therefore appended:—

194. Cœnochilus leveillei.

Pilinurgus leveillei, *Nonfried, Berlin. Ent. Zeitschr.* xxxvi, 1892, p. 372.

"Long and narrow, rather convex, finely punctured, brown, shining, naked, beneath similarly coloured but not shining.

"*Clypeus* somewhat dilated before the antennæ, with the angles rounded, nearly straight in front, closely and coarsely punctured. *Pronotum* nearly circular, very convex, closely but finely pitted, shining; mesosternal epimera strigose. *Scutellum* large, triangular, coarsely punctured. *Elytra* convex, flat on the disc, at the base broader than the thorax, narrowed behind the shoulders, then parallel-sided, rounded at the extremities, punctured near the suture, strigose near the sides, smooth and naked. *Pygidium* nearly vertical, convex, brownish-black, naked. Lower surface strigose; legs short, front tibiæ narrow at the base, becoming broader towards the end, sharply bidentate, hind tibiæ with a short spine on the outer edge.

"*Length* 16 mm."

MADRAS: Dindigul.

Genus **CALLINOMES.**

Callinomes, *Westw., Thes. Ent. Oxon.*, 1874, p. 26; *Heller, Notes Leyd. Mus.* xix, 1897, p. 177.

Type, *Callinomes vollenhovii*, Westw. (Java).

Range. The Oriental Region.

Very elongate, with the prothorax subcircular. Head strongly convex, with the eyes small and the organs of the mouth completely shut in by the mentum. Basal joint of the antenna very large, forming a plate exactly fitting the space between the mentum, front coxa and episternum, and enclosing the remainder of the antenna when at rest. Mentum very large, flat and smooth, occupying the whole lower surface of the head and projecting backwards between the coxæ. Mesosternum very narrow and not prominent between the middle coxæ. Legs moderately long, the front tibia armed externally with two minute and rather distant teeth. Tarsi 4-jointed, very short and compact, with minute claws. Terminal spiracles elevated.

♂. The abdomen is a little excavated beneath and the front tibia bears a long apical process beneath.

This genus shows all the peculiar features of the Cremastochilina at their greatest development. The remarkable box-like structure formed by the enlarged mentum and basal joint of the antenna, which completely shut in the delicate head-appendages, the thickening of the tarsi and reduced number of their joints, are parts of a protective adaptation similar to that found in beetles of many different families which inhabit the nests of Ants or Termites.

Key to the Species.

Very large; red and black .... *bicolor*, Nonfr., p. 215.
Very small; wholly black .... *pusillus*, sp. n., p. 216.

195. **Callinomes bicolor.**

Cœnochilus bicolor, *Nonfried, Berlin. Ent. Zeitschr.* xxxviii, 1893, p. 336.

Callinomes fairmairei, *Heller, Notes Leyd. Mus.* xix, 1897, p. 177 (n. syn.).

Black, with the upper surface of the head and prothorax and the basal quarter of the elytra (except the humeral callus) brick-red, a narrow stripe of the same colour extending backwards to beyond the middle near the outer margin of each elytron. The upper surface is opaque and the lower surface, with the pygidium and legs, shining black.

It is a large elongate species, rather flat above. The *head* and *pronotum* are rather finely punctured, the sides of the clypeus nearly vertical, and the front margin nearly straight and scarcely reflexed. The *prothorax* is almost circular, a little broader than

long, with the front margin straight and the posterior margin regularly rounded. The *scutellum* is strongly punctured and the *elytra* sparingly and irregularly punctured, without striæ or costæ; they are considerably broader across the shoulders than the prothorax, very feebly sinuated at the sides and a little narrowed to the extremities. The *pygidium* is small, coarsely and thickly punctured and a little depressed in the middle. The *metasternum* is rather strongly punctured, the *abdomen* feebly rugose and the terminal spiracle on each side strongly elevated. The *tibiæ* are rather long and a little incurved, and all the *tarsi* extremely short and compact.

I have not seen the male.

Length 25 mm.; *breadth* 10 mm.

Assam: Manipur.

Type in coll. Nonfried; that of *fairmairei* in the Dresden Museum.

196. **Callinomes pusillus**, sp. n.

Black, smooth and not very shining, coarsely and moderately closely punctured above and beneath.

The body is long and narrow and rather depressed. The *head* is closely punctured, with the eyes very small and inconspicuous, the front margin of the clypeus slightly excised and reflexed, and the mentum and the basal joint of the antenna very large, feebly punctured and shining. The *pronotum* is strongly punctured, not very convex, rather broader than long and a little narrower than the elytra. Its posterior half is semicircular and the anterior half slightly narrowed to the front, with the sides nearly straight. The *scutellum* bears a few large punctures and the *elytra* are thickly and closely punctured, the punctures being elongate and showing a tendency to form longitudinal rows; the sides are reflexed but not sinuated. The *pygidium* is broad and convex and, like the *metasternum* and *abdomen*, is coarsely pitted. The last pair of spiracles is very slightly elevated. The *legs* are very short, the *front tibiæ* feebly bidentate, and the *middle* and *hind tibiæ* each bear a sharp spine at the middle of the outer edge. All the *tarsi* are very short, but the articulations are distinct.

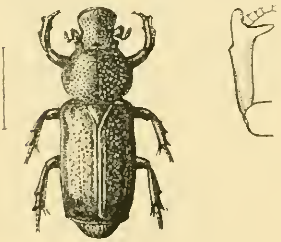

Fig. 49.
Callinomes pusillus, and fore leg of male, seen from beneath.

♂. The abdomen is shallowly grooved beneath and the front tibia bears a hook-like ventral process at its extremity.

Length 10–10·5 mm.; *breadth* 4 mm.

SIKKIM: Mungphu; ASSAM: Silhet, Patkai Mts.
Type in the British Museum.
The British Museum contains a single specimen from each of the above localities.

Genus MACROMA.

Macroma, *G. & P., Monogr. Cet.* 1833, p. 35; *Westw., Thes. Ent. Oxon.* 1874, p. 8; *Lacord., Gen. Col.* iii, 1856, p. 543.

TYPE, *Macroma cognata*, Schaum (S. Africa).
Range. Africa and Tropical Asia.

Body more or less boat-shaped, very compact, convex above, and extremely smooth and shining above and below. Legs, like the rest of the body, almost devoid of hairs, the front tibiæ bidentate and all the tarsi very short, with extremely close-fitting joints, of which the basal one is almost concealed. Clypeus simple and moderately long, gently curved in front, without reflexed margin, and curving downwards at the sides. Mandible long and very sharp at the extremity. Lobes of the maxilla forming two long sharp teeth. Mentum either (1) broad, flat and slightly emarginate in front, or (2) very protuberant beneath, the front edge forming a flat vertical surface, straight, or slightly prominent in the middle of the upper edge. Prothorax narrow in front, not margined at the sides, and straight at the basal edge or angularly prominent in the middle. Scutellum small and very acute. Elytra without striæ or costæ, very deeply cut away at the sides behind the shoulders, with the apical margins separated. There is a fine sinuated or jagged raised line crossing the elytron transversely a little before the end. The pygidium has a very sharp posterior edge, is not pointed at the end, and its dorsal surface is longitudinally carinate at the middle. Fifth ventral segment broad. Sternal process very slightly prominent, flat and a little dilated in front of the middle coxæ.

♂. Abdomen strongly arched and longitudinally channelled beneath. Hind tarsi longer than in the female.

Key to the Species.

1 (2) Mentum vertically flattened ...... *javanica*, G. & P., p. 218.
2 (1) Mentum horizontally flattened.
3 (6) Scutellar region not depressed.
4 (5) Elytra black .... *melanopus*, Schaum, p. 219.
5 (4) Elytra yellow and black .... *xanthorrhina*, Hope, p. 219.
6 (3) Scutellar region much depressed.
7 (8) Prothorax black .... *insignis*, Gestro, p. 220.
8 (7) Prothorax red .... *superba*, V. d. Poll, p. 221.

197. **Macroma javanica.**

Macroma javanica, *G. & P.*, *Monogr. Cet.* 1833, p. 148, pl. xxiii, fig. 5; *Westw.*, *Thes. Ent. Oxon.* 1874, p. 13, pl. vi, fig. 9.
Macroma nigripennis, *Schaum*, *Germar's Zeitschr.* iii, 1841, p. 279; *Ann. Soc. Ent. Fr.* 1844, pl. x (xi) fig. 7; *Westw.*, *Thes. Ent. Oxon.* 1874, p. 12, pl. vi, fig. 7 (n. syn.).
Macroma maculicollis, *Westw.*, *l. c.* p. 13, pl. vi, fig. 10.

Black, with the head, pronotum and front legs partially or entirely orange; the scutellum, side pieces of the metasternum and sides of the hind coxæ generally bright yellow, and the sides of the third and fourth abdominal segments deep red. The pronotum has commonly a black median line and a large black patch on each side, the latter frequently reduced to two spots.

The form is moderately long. The *head* is coriaceous, the clypeus nearly straight in front, and the mentum vertical in front and rather deeper than it is broad. The *prothorax* is rather short, not much narrowed in front, with the sides well punctured and the basal margin gently rounded. The *elytra* are distinctly and irregularly punctured, with their sutural margins a little depressed in front and elevated behind, the posterior end being finely rugose. The *pygidium* is very lightly strigose, with a median longitudinal carina and a blunt tubercle on each side of it. The *sternal process* is very short and rather broadly dilated, the sides of the *metasternum* are sparingly punctured, and the *abdomen* is nearly smooth.

♂. The abdomen is very strongly arched and channelled beneath.

Length 16–20 mm.; *breadth* 9–10 mm.

Sikkim: Mungphu; Assam: Khasi Hills; Burma: Bhamo; Siam; Cambodia: Malay Peninsula; China; Java; etc.

Type not traced; that of *nigripennis* in the Berlin Museum.

Var. **cingalensis**, nov.

Entirely black, except the clypeus, parts of the front legs, the side-pieces of the metasternum and the sides of the hind coxæ and third and fourth abdominal segments.

Ceylon.

This species, though very variable in colouring, is otherwise constant. The prothorax appears in every stage between uniform red and uniform black. The name *Macroma javanica* was given to a dark form in which only the head and a narrow lateral border to the pronotum are black. The darkest variety appears to be peculiar to Ceylon, from which island I have seen no representative of any other form. This variety is mentioned by Mr. Van der Poll (Notes from the Leyden Museum, xvii, 1895, p. 132). A

specimen was found in a red ants' nest at Sigirya, Ceylon, by Mr. R. C. Punnett. It is remarkable that this very widely-distributed species should be found only in the north-east and extreme south of our region.

198. Macroma melanopus.

Macroma nigripennis, *Hope* (nec *Schaum*), *Trans. Ent. Soc.* iii, 1841, p. 65.
Macroma melanopus, *Schaum*,* *Verz. Lamell. Melit.* 1848, p. 60; *Westw.*, *Thes. Ent. Oxon.* 1874, p. 12, pl. vi, fig. 8.

Black, with the clypeus and an angular prolongation between the eyes, the lateral and hind margins of the pronotum (except a small black spot in the middle of each lateral border), the sides of the metasternum and hind coxæ, and the antennal club yellow.

The shape is very convex and moderately elongate. The *head* is coriaceous, with the front of the clypeus rounded and the mentum horizontal. The *pronotum* is rather sparingly and finely punctured, rather transverse, with the sides strongly bisinuated and the basal margin slightly angulated in the middle. The *elytra* are uniformly convex and finely and irregularly punctured, except at the extremities, which are strigose. The *pygidium* is smooth, with a sharp median carina and a rounded boss on each side. The *sternal process* is very short, the *metasternum* slightly strigose and pubescent at the sides, and the *abdomen* almost smooth.

♂. The abdomen is strongly arched and deeply grooved, and the two penultimate segments are closely punctured and hairy in the middle.

Length 19 mm.; *breadth* 10·5 mm.

ASSAM: Khasi Hills, Manipur, Sylhet, Jaintia Hills; BURMA: N. Khyen Hills; SIAM.

Type in the Oxford Museum; co-type in the British Museum.

199. Macroma xanthorrhina. (Plate II, fig. 1.)

Campsiura xanthorrhina, *Hope*,* *Gray's Zool. Misc.* 1831, p. 25; *Westw.*, *Thes. Ent. Oxon.* 1874, p. 11, pl. vi, fig. 6.
Macroma bicolor, *G. & P.*, *Monogr. Cet.* 1833, p. 149, pl. xxiii, fig. 6; *Burm. Handb. Ent.* iii, 1842, p. 643.

Black, with the clypeus and an angular prolongation between the eyes, the lateral margins of the pronotum (except a small median black spot on each side), and the elytra (except narrow sutural and lateral margins and a broad posterior margin) yellow. There is a slight expansion of the black lateral margin just beyond the middle, a black patch sometimes appears upon the suture opposite this, and in some specimens a transverse band is formed by their fusion.

The form is rather slender. The *head* is coriaceous, with its front margin rounded and very gently curved upwards, and the mentum horizontal. The *pronotum* is distinctly, but sparingly and irregularly, punctured, rather narrow in front, with the lateral margins strongly bisinuate and the basal margin nearly straight but slightly angulated in the middle. The *elytra* are extremely sparingly punctured, with the suture a little depressed in front and elevated behind: the apical part is finely strigose and limited in front by a sinuated carina. The *pygidium* is shining and nearly smooth, with a median longitudinal carina and a blunt tubercle on each side. The *sternal process* is small, very feebly produced and dilated, the sides of the *metasternum* are finely strigose and hairy, and the *abdomen* is feebly rugose at the sides.

The front tibiæ are sharply bidentate in the female, but the upper tooth is absent in the male, in which also the hind tibia is slightly curved and drawn out into a single sharp spine. The abdomen is deeply channelled in this sex.

Length 20–22 mm.; *breadth* 10–11 mm.

Nepal; Sikkim: Darjiling; Assam: Manipur; Burma: N. Khyen Hills.

Type in the British Museum.

200. Macroma insignis.

Macroma insignis, *Gestro,* Ann. Mus. Genova,* (2) x, 1891, p. 852, pl. ii, fig. 10.

Shining black above and beneath, with the antennæ and the head, except at the sides behind the eyes, bright orange.

Elongate, broad at the shoulders and very tapering, depressed in the scutellar region and very smooth. The *clypeus* is coriaceous, parallel-sided and nearly straight in front, and the mentum horizontal. The *pronotum* is very feebly punctured at the sides, narrow in front and broad behind, with the sides nearly straight, the hind angles almost acute and the base trisinuate. The *elytra* are almost smooth, with a sharp jagged carina before the apex. The *pygidium* is finely strigose, with an impression at the apex, a sharp median carina and a spinose elevation on each side. The *sternal process* is very broad and flat, the sides of the *metasternum* are finely strigose, and the *abdomen* is almost smooth. The fifth ventral segment is very broad, thinly punctured posteriorly and slightly deflected. The external edge of the *hind tibia* is produced and bifid at the end and the *tarsi* are short and thick.

Only female specimens seem yet to have been found.

Length 28 mm.; *breadth* 15·5 mm.

Burma: Karen-ni, Geku Distr. (*L. Fea*).

Type in the Genoa Museum.

201. **Macroma superba.**

Macroma superba, *Van de Poll, Notes Leyden Mus.* xi, 1889, p. 143; *Gestro, Ann. Mus. Genova,* (2) x, 1891, p. 853, pl. ii, fig. 11.
Macroma gloriosa, *Westw.* (nec *Mohnike*), *Thes. Ent. Oxon.* 1874, p. 14, pl. vii, fig. 1.

Shining black, with the head and prothorax crimson, the latter decorated with three small black spots placed in a triangle on each side and the front and hind margins very narrowly black.

Rather short, broad at the shoulders, with the upper surface very convex and strongly depressed in the region of the scutellum. The *head* is coriaceous, with the clypeus rather transverse, parallel-sided and almost straight in front, and the mentum horizontal. The *pronotum* is punctured at the sides, narrow in front and broad behind, with the posterior angles well-marked and the base very obtusely angulated in the middle. The *scutellum* is acute at the apex, but not produced as in *M. melanopus*, *nigripennis*, &c., and the *elytra* are almost impunctate, with the apical area limited by a zigzag carina in front and feebly strigose; the anterior half of the suture is depressed and the posterior half elevated. The *pygidium* is rugose, slightly bilobed at the apex, with a sharp median carina and an elevation on each side produced backwards as a sharp spine. The lower, like the upper surface, is almost smooth, and the fifth ventral segment is twice the width of those preceding it and bent downwards at an angle to them. The *sternal process* is very broad. The external face of the *hind tibia* is produced and bifid and the *hind tarsus* is short and thick.

The male is apparently unknown.

Length 25 mm.; *breadth* 14 mm.

Burma: Karen Hills; Siam (*Mouhot*).

Type in coll. O. E. Janson.

The late Col. Bingham found this beautiful insect upon the flowers of the Ironwood Tree (*Xylia dolabriformis*) in the Karen Hills.

Division II. VALGINI.

This is a very well-defined group, one of the chief characteristics of which is the diminutive size of its members. Many are very small indeed, and the largest are little larger than the smallest species found in the other groups of the CETONIINÆ. Another conspicuous feature is the almost universal clothing of scales, which are sometimes flat and close, sometimes long and erect. The head is long and narrow and capable of being folded closely beneath the sternum, being then concealed from above by the prominent front part of the pronotum. The latter is generally distinctly narrower than the width of the body across the shoulders, with the base rounded and not emarginate in the middle. The scutellum is small, its sides convex and its apex not very acute. The elytra are generally short and broad, not at all cut away at the sides, rounded at the extremities and leaving exposed the pygidium and propygidium, which are broad and prominent, the last pair of spiracles in most genera being borne upon very prominent tubercles at the sides of the latter segment. The front tibia is toothed along the entire outer edge, bearing generally five, but sometimes only three teeth. The front coxæ are very prominent and contiguous and the middle and hind coxæ widely separated. The mesosternum is not produced. The tarsi, with few exceptions, are very long and slender. The anterior abdominal segments are short and the fifth segment relatively very wide. The antennæ and the organs of the mouth do not differ from those of the CETONIINI.

The sexual differences are very various. In certain forms the extremity of the abdomen is produced in the female into a long and slender style or ovipositor.

A European species, *Valgus hemipterus*, is the only representative of the group of which the habits are known. M. Fallou (Bull. Soc. Ent. France, 1880 and 1888) records that he found this in all stages in the buried part of stakes of *Acacia* and other wood, which they in time completely destroyed, even when charred or tarred before use. The eggs appear to be deposited at the lowest part and the larvæ work upwards through the wood to near the surface of the ground.

The great majority of the VALGINI inhabit the Oriental Region.

Table of the Genera.

1	(10)	Pygidium very convex, much broader than long: ♀ without caudal appendage.	
2	(9)	Front tibia armed with three teeth.	
3	(6)	Pronotum having two sharp median carinæ.	
4	(5)	Tarsi slender	OREODERUS, p. 223.
5	(4)	Tarsi very short and thick	PODOVALGUS, p. 229.

6 (3)	Pronotum not distinctly carinate.	
7 (8)	Terminal spiracles not prominent: body not tufted	IDIOVALGUS, p. 230.
8 (7)	Terminal spiracles prominent: pronotum and propygidium tufted....	XENOREODERUS, p. 232.
9 (2)	Front tibia armed with five teeth ..	DASYVALGUS, p. 233.
10 (1)	Pygidium flat, about as long as it is broad: ♀ with caudal appendage..	CHARITOVALGUS, p. 246.

Genus OREODERUS.

Oreoderus, *Burm., Handb. Ent.* iii. 1842, p. 726; *Kolbe, Stettin. Ent. Zeit.* 1904, p. 25.

TYPE, *Valgus argillaceus*, Hope.

Range. India, Burma, Siam, and the Malayan Region.

Body of variable shape, but frequently long and narrow, clothed with short flat scales, the legs not long, the front tibia armed with three very strong teeth occupying the whole outer edge, the first joint of the hind tarsus shorter than the succeeding one. Clypeus moderately long, contracted in front of the eyes, broadly rounded in front, with the angles deflexed, sometimes sharp but not conspicuous. First joint of the antenna large, produced beyond the point of articulation of the second joint. Prothorax rather narrow, the episterna produced freely forward and forming with the front coxæ a deep cavity for the reception of the head. Pronotum bearing two strong ridges, prominent and generally united in front. The propygidium and pygidium are broad and exposed, the terminal spiracles scarcely elevated, except in *O. momeitensis.* The fifth ventral segment is twice the length of the anterior segments.

The sexual differences are various and often very great. Usually the female is relatively narrower than the male, but in *O. gravis* it is broader. The propygidium is frequently horizontal and more or less produced in the female and there is sometimes a colour difference. The hind tarsi of the male are longer.

Key to the Species.

1 (2)	Pronotum bearing two hooked tubercles in front..........................	*argillaceus*, Hope, [p. 224.
2 (1)	Pronotum bearing a rounded lobe in front.	
3 (4)	Terminal spiracles sharply elevated ..	*momeitensis*, sp. n., [p. 224.
4 (3)	Terminal spiracles scarcely elevated.	
5 (10)	Thoracic carinæ not continued backwards beyond the middle.	
6 (9)	Body long; elytra not tuberculate behind.	
7 (8)	Posterior angles of thorax very blunt..	*bhutanus*, sp. n., [p. 225.
8 (7)	Posterior angles of thorax sharp	*rufulus*, Gestro, p. 225.
9 (6)	Body short; elytra tuberculate behind.	*brevipennis*, Gestro, [p. 226.
10 (5)	Thoracic carinæ extending backwards beyond the middle.	
11 (16)	Elytra not tuberculate behind.	

12 (15) Propygidium notched in the middle or nearly straight. [p. 226.
13 (14) Prothorax dilated at the base .... *waterhousei*, Gestro,
14 (13) Prothorax not dilated at the base .... *maculipennis*, Gestro, [p. 227.
15 (12) Propygidium prominent in the middle . *humeralis*, Gestro, [p. 228.
16 (11) Elytra tuberculate behind .... *gravis*, sp. n., p. 228.

202. Oreoderus argillaceus.

Valgus argillaceus, *Hope*,* *Ann. Nat. Hist.* viii, 1842, p. 302 (1841).

Dark brown, clothed with not very large or close-lying greyish scales above, and with larger and denser scales beneath.

Fig. 50.—*Oreoderus argillaceus.*

The body is long and narrow. The *clypeus* is rounded in front and strongly contracted in front of the eyes; the basal joint of the antenna is large. The *pronotum* is long, with a median furrow bordered on each side by a straight carina, which is produced in front into a strong tubercle directed forwards and upwards, and bearing two other smaller erect tubercles placed at equal distances posteriorly. The sides are strongly curved and each bears three equidistant tubercles, the two posterior ones minute, and there is another tubercle placed on each side of the disc before the middle. The base is strongly rounded and the hind angles are very slightly prominent. The *scutellum* is long and narrow. The *elytra* are narrowed from base to apex and striated, the scales being arranged in well-marked bands. The hind margin of the *propygidium* is nearly straight.

I have discovered no external sexual difference.

Length 8–9 mm.; *breadth* 3·5–4 mm.

Madras: Mysore, Nilgiri Hills (*H. L. Andrewes*).

Type in the Oxford Museum.

203. Oreoderus momeitensis, sp. n.

Dark brown, clothed with greyish scales, usually with lighter scales forming a small transverse bar crossing the elytral suture at the middle.

The body is depressed and moderately elongate. The *prothorax* is narrow, with the sides curvilinear and very feebly diverging to the base, which is very convex, with the angles obtuse. There is a sharply-elevated looped carina, which extends beyond the middle, and an oblique outer carina on each side before the middle. The *scutellum* is rather long and narrow. The *elytra* are separately rounded behind and the lateral costæ are not tuberculate at the

end. The *propygidium* is straight at the posterior margin and the terminal spiracles are sharply prominent.

Length 7·5–8·5 mm.; *breadth* 4–4·5 mm.

UPPER BURMA: Momeit, 1800 ft. (*W. Doherty*).

Type in the British Museum; cotypes in coll. R. Oberthür.

This species has been kindly presented by M. René Oberthür to the British Museum.

204. **Oreoderus bhutanus**, sp. n.

Dark brown, clothed densely with scales, which are brown or buff above and greyish beneath, the elytra usually decorated with a pale spot in the middle of each.

The body is very elongate and depressed. The *prothorax* is long, rather parallel-sided, with a prominent loop in front, and distinctly dilated at the posterior angles, each lateral margin having two distinct indentations. The dorsal carinæ do not reach the middle and there is a slight oblique carina on each side before the middle. The *scutellum* is long, narrow and rather acute at the apex. The *elytra* are long and the lateral costæ not tuberculate at the posterior end. The *propygidium* is produced into a short lobe and notched in the middle, and the *pygidium* is not large.

♂. In addition to the pale spot, the front, hind and sutural margins of the elytra are sometimes lighter in colour, and also the margins of the propygidium. The hind tarsi are longer than the tibiæ.

♀. The colour of the upper surface is always dark brown. The body is narrower, the propygidium longer and nearly horizontal, and the hind tarsi are not longer than the tibiæ.

Length 8–9 mm.; *breadth* 3·5–4·5 mm.

BHUTAN: Maria Basti (*L. Durel*).

Type in the British Museum; cotypes in coll. R. Oberthür.

The British Museum is indebted to M. René Oberthür for this species.

205. **Oreoderus rufulus.**

Oreoderus rufulus, *Gestro*,* *Ann. Mus. Genova*, (2) x, 1891, p. 867.

Black, brown or chestnut-red, clothed with scales which on the upper surface are dark chocolate or reddish, with a small pale spot at the middle of each elytron, and on the lower surface and the lower part of the pygidium silvery grey.

The *prothorax* is moderately long, with the sides nearly parallel behind and the hind angles rather sharp. The *scutellum* is rather long and narrow. The *elytra* are moderately long and the lateral costa is not tufted nor very prominent at its hinder end. The apices of the elytra are simply rounded, and the *propygidium* is not indented at the middle of the hind margin.

♂. The pronotum bears in front a looped carina, the ends of

which converge markedly behind and vanish before the middle, and in addition a short oblique carina on each side, which reaches the lateral margin anteriorly and vanishes a little behind the inner carinæ. The pale elytral spot is very oblique, narrow and inconspicuous. The abdomen is slightly hollowed at the base beneath, and the hind tibiæ are strongly dilated at the end.

♀. The body is more elongate and parallel-sided, and entirely clothed with pinkish silvery scales, amongst which the pale elytral spot is very inconspicuous. The propygidium is very wide, horizontal and broadly prominent in the middle. The abdomen is convex, the hind tibiæ not dilated at the end, and the tarsi short.

Length 9·5–11 mm.; *breadth* 5·5 mm.

Burma: Karen Hills (*L. Fea*).

Type in the Genoa Museum.

The species was described by Dr. Gestro from pale-coloured (perhaps rather immature) male specimens. A single female found at the same time as the series of ten males appears to me almost certainly to belong to the species.

206. Oreoderus brevipennis.

Oreoderus brevipennis, *Gestro,* Ann. Mus. Genova,* (2) x, 1891, p. 868.

Dark brown, clothed with reddish-brown scales above and lighter scales beneath, the elytral suture and a narrow transverse mark on each being also pale.

The form is short and broad. The *prothorax* is rather quadrate, with the anterior part prominent in the middle, the posterior angles very blunt and the base not dilated. The discoidal carinæ form a loop in front, they do not strongly converge behind and are interrupted before the middle, reappearing behind the middle and again before the base. The lateral carinæ are strong but do not reach the margins. The *scutellum* is broad at the base and strongly triangular. The *elytra* are broad and the lateral costa is prominent at the posterior end. The *propygidium* is gently excised at the middle of the hind margin. The *hind tibia* and the first joint of the *hind tarsus* are dilated at the end.

♂. The prothorax is shorter and more quadrate than that of the female, and is slightly emarginate before the scutellum. The hind extremity of the elytral costa bears a tuft of hairs.

Length 9 mm.; *breadth* 5 mm.

Burma: Karen Hills, Mandalay.

Type in the Genoa Museum; cotype in the British Museum.

207. Oreoderus waterhousei.

Oreoderus waterhousei, *Gestro,* Ann. Mus. Genova,* (2) x, 1891, p. 865.

Dark brown or chestnut, clothed above with greyish brown

scales, with a whitish spot in the middle of each elytron, and beneath with silvery grey scales.

The *prothorax* is bell-shaped, with the hind angles obtuse and the base regularly rounded. There is a carinate loop in front, which widens rather rapidly in its anterior part, its limbs being continued backwards beyond the middle of the pronotum, and a very short oblique carina on each side. The *scutellum* is long and narrow. The *elytra* are rather short and the lateral costa on each side is not tufted nor strongly marked at the end.

♂. There is a dark patch on each side of the basal part of the pronotum, and the central part of each elytron, except the pale spot, is also dark. The abdomen is slightly hollowed at the base beneath, and the hind tibia is scarcely dilated at the end.

♀. The body is more elongate, the scales more uniformly pale, and there is a pinkish area at the base of the elytra. The propygidium is broad and horizontal, with the middle part rather prominent and minutely notched. The tarsi are shorter and the abdomen more convex than in the male.

Length 9–11 mm.; *breadth* 5 mm.

BURMA: Karen Hills, Palon (*L. Fea*).

Type in the Genoa Museum.

208. **Oreoderus maculipennis.**

Oreoderus maculipennis, *Gestro,* Ann. Mus. Genova*, (2) x, 1891, p. 869.

Dark brown or chestnut, clothed with greyish brown scales above and pale greyish ones beneath.

The *prothorax* is rather narrow, with a deep median furrow and a strongly-marked impression on each side. There is a carinate dorsal loop which is broad in front, strongly contracted before the middle and evanescent beyond it. The lateral margins are indented in the middle and not divergent at the base, the posterior angles are obtuse and the basal margin distinctly angulate in the middle. The *scutellum* is narrow and sharply pointed. The *elytra* are rather parallel-sided and without apical projections. The hind margin of the *propygidium* is nearly straight and minutely notched in the middle.

♂. The central part of each elytron is chocolate-colour, crossed at the middle by a short bar of nearly white scales. The abdomen is slightly arched and the hind tarsi are a little longer than those of the female.

♀. The body is more elongate and the scales of the upper surface are almost uniformly grey, but there is a short longitudinal reddish humeral patch upon each elytron.

Length 8 mm.; *breadth* 4 mm.

BURMA: Bhamo (*L. Fea*).

Type in the Genoa Museum.

Three specimens in the Genoa Museum were taken by Fea on different occasions. The type is a male, but I have every reason to believe, on structural grounds, that I have rightly associated the two sexes.

209. **Oreoderus humeralis.**

Oreoderus humeralis, *Gestro,* Ann. Mus. Genova,* (2) x, 1891, p. 864.

Dark brown or chestnut, clothed with brownish or brownish grey scales above, and with lighter ones beneath.

The *prothorax* is bell-shaped, prominent in front, with the sides sinuated and divergent at the posterior angles, which are obtuse, and the base very obtusely angulate in the middle. There is a discoidal loop, the limbs of which closely approach one another before the middle of the pronotum and are produced distinctly behind the middle, and an oblique lateral carina on each side not reaching the margin. The *scutellum* is rather narrow, with the sides divergent and rather straight, and the apex sharp. The *elytra* are striated and the lateral costæ are not very prominent behind. The *propygidium* is produced in the middle.

♂. The central part of each elytron is chocolate-coloured with a pale transverse mark at the middle. The abdomen is slightly hollowed at the base, and the middle and hind tarsi are distinctly longer than those of the female.

♀. The body is more elongate and clothed with greyish scales, those on the hinder part of the pronotum and the elytra being brown, and the latter having each a conspicuous elongate red patch at the shoulder. The propygidium is large and horizontal, and produced into a sharp angle in the middle.

Length 8–9 mm.; *breadth* 3·5–4 mm.

Burma: Bhamo (*L. Fea*).

Type in the Genoa Museum.

This species was described from female specimens, to which alone the name is appropriate.

210. **Oreoderus gravis,** sp. n.

Chocolate-colour, rather densely clothed with round scales, except upon the scutellum which is smooth and shining, those of the lower surface, propygidium and pygidium being large and grey, while those of the head, pronotum and elytra are smaller and darker, but relieved with paler scales at the base, apex, sutural margins and middle of the elytra.

It is a large, broad species. The *clypeus* is not long, well rounded in front and armed with a minute bifid process at the middle of the front margin. The *prothorax* is relatively small and narrow, with the sides rounded in front and nearly parallel behind, the base rounded and the disc bearing a carinate loop, a little constricted before the middle and produced beyond it, and a very short oblique carina on each side. The *scutellum* is rather broad. The *elytra* are broader conjointly than their length, with their lateral costæ sharply prominent at the end. The *legs* are not long, the two terminal teeth of the *front tibia* are very large and sharp, and the third tooth is very short.

♂. The propygidium is gently excised in the middle of the hind margin and the hind tarsi are distinctly longer than those of the female.

♀. The body is relatively broader and the prothorax is more abruptly narrowed in front. Each elytron has a thick longitudinal brush of erect dark hairs within and behind the shoulder.

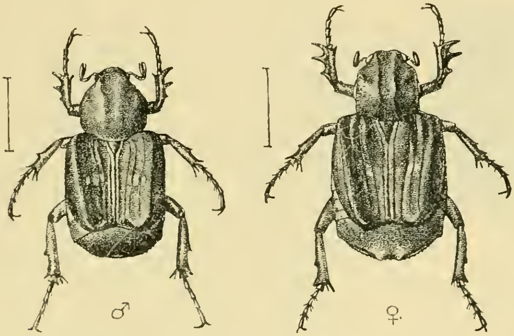

Fig. 51.—*Oreoderus gravis*, male and female.

The propygidium is horizontal and produced backwards, with two sharp points near the middle of the hind margin.

Length 10–11 mm.; *breadth* 5–6 mm.

MADRAS: Nilgiri Hills, Travancore, Permaid.

Type in the British Museum; cotypes in the Oxford Museum and Mr. H. E. Andrewes' collection.

Genus **PODOVALGUS**, nov.

TYPE, *Podovalgus griseus*, sp. n.

Range. That of the type.

Body elongate, depressed above and clothed with scales. Legs short; the front tibiæ acutely tridentate, the teeth rather close together and the uppermost one placed at about the middle of the outer edge; all the tarsi very short, thick and compact, and the claws short and apposed. Clypeus long, parallel-sided and emarginate at the end, with the angles reflexed and blunt. Prothorax not dilated beyond the middle, with a nearly complete longitudinal median furrow, bordered by two prominent, nearly parallel carinæ. Scutellum moderately long. Terminal spiracles borne by prominent tubercles situated at the hind margin of the propygidium. Fifth ventral segment as long as the three preceding together.

The sexes are alike, but the abdomen of the male is very slightly arched beneath.

Only the following new species is known. It seems probable from its peculiar structure and aspect that it is an inhabitant of ants' nests, although no record of its capture is available.

211. **Podovalgus griseus**, sp. n.

Black or pitchy brown, clothed above and beneath, but not densely, with flat greyish scales.

The *clypeus* is quadrate, broad in front, where it is notched at an obtuse angle, the corners being strongly reflexed and strongly bent outwards. The *prothorax* is elongate, broad in front, with the median part prominent, the sides sinuated and rather converging behind, the base being broadly rounded. The longitudinal carinæ extend almost the entire length of the pronotum, and there are two large tubercles on each side situated at the corners of a transverse parallelogram. The *scutellum* is triangular. The *elytra* are deeply striated and the interstices clothed with rows of uniform grey scales. There is a slight elevation before the middle of each elytron near the suture. The *propygidium* and *pygidium* are uniformly, but not densely, clothed with grey scales, and the former is convex with its hind margin nearly straight. The *legs* are moderately stout and all the tarsi thick and very compact, the basal joint of the hind tarsus broad and transverse.

Fig. 52.—*Podovalgus griseus.*

♂. The fifth ventral segment is a little shorter than in the female, and the abdomen slightly arched.

Length 6·5–9 mm.; *breadth* 3·5–4·5 mm.

Bengal: Barway (*P. Cardon*).

Type in the British Museum; cotypes in the Brussels Museum.

A series of specimens of this interesting insect was sent to me by M. Severin, of the Brussels Museum.

Genus **IDIOVALGUS**, nov.

Type, *Oreoderus planicollis*, Gestro.

Range. That of the type.

Form rather short and stout and the legs not very long. Clypeus moderately broad, the front and sides forming a continuous curve. Prothorax subcircular, without discoidal carinæ, the base and sides strongly curved, the former overlapping the scutellum, and the hind angles obsolete. Scutellum short. Propygidium without prominences, the terminal spiracles not elevated. Front tibia stout and armed with three slender acute teeth, placed rather far apart, the uppermost near the base. Tarsi moderately slender, the basal joint of the hind tarsus strongly triangular and not longer than the succeeding joint. The maxilla bears a thick tuft of long hairs and the last joint in all the palpi is large.

♀. More stoutly built, with the tarsi shorter, the scutellum occupying a depression, and the pronotum distinctly lobed behind.

Only one species of the genus is known.

212. **Idiovalgus planicollis.**

Oreoderus planicollis, *Gestro,* Ann. Mus. Genova,* (2) x, 1891, p. 862.

Bright reddish yellow, with the head and prothorax sometimes darker.

It is a rather small but stoutly built insect. The *head* is granulated and the *clypeus* rounded in front. The *pronotum* is also granulated and has a very slight median groove, not bordered by carinæ, and an impression on each side. It is gently convex, a little longer than it is broad, rounded at the sides and base, and about equally narrowed in front and behind. The *elytra* are distinctly striate-punctate, with the sides closely rugose. The *propygidium* is simple, with a straight margin.

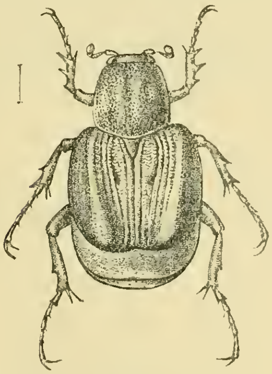

Fig. 53.
Idiovalgus planicollis, male.

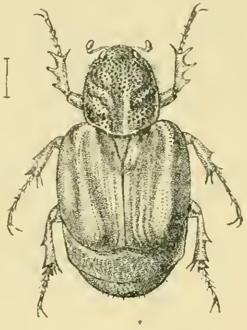

Fig. 54.
Idiovalgus planicollis, female.

♂. The body is partially clothed above and below with pale yellow scales, which are dense round the scutellum and upon the pygidium and propygidium. The pygidium is vertical.

♀. The body is very shining above and beneath and only thinly and partially clothed with short, silky golden hairs. The scutellar region is strongly depressed and overhung by a well-marked broad and rounded lobe at the hind margin of the pronotum. The pygidium is protuberant and has a broad ventral face. The hind legs are very short.

Length 5 mm.; *breadth* 3 mm.

Burma: Teinzo (*L. Fea*).

Type in the Genoa Museum; cotypes in the British Museum.

This curious little insect was found digging in the sandy bed of dried-up torrent.

Genus **XENOREODERUS**, nov.

Type, *Oreoderus humilis*, Gestro.

Range. The Oriental Region.

Body stout and compact, clothed with scales and hairs, some of which form erect tufts upon the pronotum and propygidium. Clypeus moderately broad in front and strongly contracted before the eyes. Prothorax narrower than the combined width of the elytra, not bearing produced dorsal carinæ anteriorly. Scutellum moderately short. Terminal spiracles borne upon prominent tubercles at the hind margin of the propygidium. Legs moderately slender, the front tibia armed with three strong teeth, the tarsi slender and the first joint of the hind tarsus equal in length to the second.

I have detected no sexual differences in the specimens examined.

This genus is intermediate in its characters between *Oreoderus* and *Dasyvalgus*. Its species are probably rather numerous, *Valgus pygmæus*, G. & P., being one of them. This species is quoted in the Munich Catalogue as inhabiting "India orientalis." Its exact habitat was unknown to the original describers, but it was found by Dr. Schaum (see Ann. Soc. Ent. France, 1844, p. 399) to be a Malayan species.

Key to the Species.

Elytral scales uniform and evenly distributed.	*humilis*, Gestro, p. 232.
Elytral scales unevenly distributed	*occidentalis*, sp. n., p. 233.

213. **Xenoreoderus humilis.**

Oreoderus humilis, *Gestro,* Ann. Mus. Genova*, (2) x, 1891, p. 863.

Black, or nearly black, with the antennæ and legs reddish, and the body rather uniformly clothed above and below with greyish scales.

Fig. 55. *Xenoreoderus humilis.*

The body is small but stoutly built and the legs are slender. The *clypeus* is bare and granular, rounded in front. The *prothorax* is about as long as it is wide at the base, bell-shaped, with the sides regularly curved and not contracted at the base, the hind margin strongly rounded and the hind angles obtuse. There is a slight median groove bordered by a double row of brown tufted tubercles, viz. a pair near the front margin, a pair near the middle and a pair near the base. There are also two external tufts on each side, one near the middle and the other just before the hind angle. The *scutellum* is rather short and not very sharp at the apex. The

elytra are regularly striated, clothed with uniform grey scales, with the humeral calli prominent and the apical calli slightly tufted. The *propygidium* is not wide and the hind margin is broadly excised in the middle and tufted at each end of the emargination. The three teeth of the *front tibia* are sharp, and all the *tarsi* are slender, with the joints of equal length.

The three typical specimens which I have examined appear to be all males.

Length 4·5 mm.; *breadth* 3 mm.

BURMA: Karen Hills (*L. Fea*).

Type in the Genoa Museum; cotype in the British Museum.

214. **Xenoreoderus occidentalis**, sp. n.

Deep red-brown, with the head, legs, scutellum and margins of the pronotum and elytra generally black: irregularly clothed with not close-lying yellow scales, which are frequently larger and closer at the sides, base and middle of the pronotum, in the middle of each elytron and near the scutellum.

The form is stout and the legs moderately long. The *clypeus* is rounded in front. The *pronotum* is scarcely longer than it is wide, convex, longitudinally grooved at the middle, prominent in front, with the sides nearly straight and parallel, but strongly curved in front, the base strongly rounded and the hind angles very obtuse. There are four inconspicuous tufts near the base and two near the middle. The *scutellum* is very feebly elongate. The *elytra* are not tufted, the *propygidium* and *pygidium* are rather closely scaly and the former bears a pair of tufts at the hind margin. The three teeth of the *front tibia* are sharp, and all the *tarsi* are slender, with the joints of equal length.

I have found no sexual difference in the specimens examined, which were collected by Mr. H. Kemball.

Length 5·5 mm.; *breadth* 3·5 mm.

BOMBAY: Belgaum.

Type in the British Museum; cotypes in coll. Andrewes.

Genus **DASYVALGUS.**

Dasyvalgus, *Kolbe, Stettin. Ent. Zeit.* lxv, 1904, p. 34.

TYPE, *Valgus vethi*, Ritsema (Sumatra and Borneo).

Range. Tropical Asia.

Form very various, but generally short, the body more or less clothed with scales or setæ. Legs generally slender; the front tibia toothed from end to end of the outer edge, the teeth numbering five, of which the 1st and 3rd (counting from the apex) are generally very long and the 4th frequently very blunt; the tarsi long, with the 1st joint longer than the 2nd. Prothorax much narrower than the elytra together, with two longitudinal dorsal carinæ, and generally several tufts of erect setæ. Terminal

spiracles placed upon prominent tubercles near the hind margin of the propygidium, which usually bears also two tufts of setæ near the middle. Pygidium convex and strongly transverse.

There is no caudal spine in the female. The middle and hind tarsi are generally longer in the male and the pygidium is sometimes different in shape, but differences of colour and pattern also occur. The female is much less commonly found than the male.

Key to the Species.

1 (30)	First joint of hind tarsus much longer than the 2nd.	
2 (7)	Hind tarsus rather broad and flat.	
3 (6)	Sides of prothorax gently rounded in front.	
4 (5)	Sides of prothorax a little contracted at the hind angles	*dohrni*, Kolbe, p. 235.
5 (4)	Sides of prothorax not contracted at the hind angles	*luctuosus*, Gestro, p. 236.
6 (3)	Sides of prothorax strongly rounded in front	*viduatus*, sp. n., p. 236.
7 (2)	Hind tarsus simple and slender.	
8 (25)	Pygidium not covered with decumbent scales.	
9 (18)	Pygidium bare and shining, or with a very few minute setæ.	
10 (13)	Pygidium red.	
11 (12)	Pygidium unicolorous	*militaris*, sp. n., p. 237.
12 (11)	Pygidium white-spotted	*stictopygus*, Gestro, p. 237.
13 (10)	Pygidium black.	
14 (17)	Propygidium not covered with scales.	
15 (16)	Pronotum distinctly tufted in the middle	*tristis*, Gestro, p. 238.
16 (15)	Pronotum not distinctly tufted in the middle	*carbonarius*, sp. n., p. 239.
17 (14)	Propygidium densely clothed with scales	*podicalis*, Blanch., p. 240.
18 (9)	Pygidium clothed with conspicuous erect setæ.	
19 (20)	Terminal spiracles feebly elevated.	*insularis*, sp. n., p. 240.
20 (19)	Terminal spiracles strongly elevated.	
21 (22)	Sides of prothorax scarcely rounded.	*trisinuatus*, Gestro, p. 241.
22 (21)	Sides of prothorax strongly rounded.	
23 (24)	Colour red	*hystrix*, sp. n., p. 241.
24 (23)	Colour dark, with the pygidium light	*fulvicauda*, sp. n., p. 242.
25 (8)	Pygidium clothed with decumbent scales.	
26 (27)	Colour reddish, with black and yellow scales	*ovicollis*, sp. n., p. 242.

27 (26) Colour black, with greyish scales.
28 (29) Sides of prothorax strongly rounded in front .... *penicillatus*, Blanch., p. 243.
29 (28) Sides of prothorax little rounded in front .... *minimus*, sp. n., p. 244.
30 (1) First joint of hind tarsus not much longer than 2nd.
31 (32) Sides of prothorax little rounded in front .... *addendus*, Walk., p. 244.
32 (31) Sides of prothorax strongly rounded in front .... *kanarensis*, sp. n., p. 245.

Dasyvalgus pyrropygus, Kraatz, a Malayan species, has been recorded by Dr. Kolbe from Burma, but as the characters he has assigned do not agree well with those of the type, which I have examined, I have not included it here.

215. **Dasyvalgus dohrni.** (Plate II, figs. 6 & 7.)

Dasyvalgus dohrni, *Kolbe, Stettin. Ent. Zeit.* lxv, 1904, p. 41.

Black or very deep chocolate-colour, clothed with fine setæ and decorated with orange or yellow scales, which are numerous and closely packed in the male, forming a very conspicuous pattern, and in the female fewer, less close and inconspicuous.

The *clypeus* is long, distinctly bilobed and not closely punctured. The *pronotum* is moderately long, bell-shaped, with the sides and base regularly and gently curved. The dorsal carinæ are nearly parallel and tufted near the middle and at the hinder extremities. The *scutellum* is moderately long and blunt. The *elytra* are deeply striated and separately rounded at the end. The *propygidium* is tufted on each side of the middle and the terminal spiracles are moderately prominent. The *front tibia* is broad and armed with five strong teeth and the basal joint of the *hind tarsus* is twice as long as the second joint. The upper side of the hind femur is clothed with grey scales.

♂. The pronotum is covered with yellow scales, except at the hinder median part, and the elytra have each a large median yellow patch and usually a smaller and paler one external to it, a patch adjoining the scutellum, another in the sutural angle and several inconspicuous longitudinal lines of scales following the intervals between the striæ. The greater part of the lower surface of the body is clothed with pale yellow scales. The three distal teeth of the front tibia are long and acute and the hind tarsus is about half as long again as the tibia.

♀. The yellow markings of the male are only vaguely represented by a few greyish yellow scales. The body is more elongate, the propygidium more extended, and the pygidium has a smooth flattened ventral plate. The front tibia is broader than that of the male and all its teeth very blunt. The hind tarsus is stout and only a little longer than the tibia.

Length 6–7 mm.; *breadth* 4·5 mm.

TENASSERIM: Tavoy, Mergui (*Doherty*); PERAK; PENANG; JAVA; SUMATRA.

216. **Dasyvalgus luctuosus.**

Valgus luctuosus, *Gestro,* Ann. Mus. Genova,* (2) x, 1891, p. 858.

Very deep brown or black, shining, but clothed with minute erect setæ, with two minute patches of decumbent ochreous scales placed transversely at the middle of each elytron.

The body is moderately elongate and the *legs* stout, with rather short tarsi, the hind ones rather flattened and the first joint not long but twice the length of the second. The sides of the *prothorax* are almost straight, gently converging towards the front, where they are a little rounded. There are two straight parallel dorsal ridges ending at about the middle of the disc, where they bear a pair of tufts, and there are four similar tufts near the base. The *scutellum* is moderately large and long and the *elytra* are deeply striated, with slight tufts at the shoulders and apical calli. There are two distant tufts at the hind margin of the *propygidium* and the terminal spiracles are slightly prominent. The *front tibia* is rather short and broad, with the 1st, 3rd and 5th teeth strong but not very sharp, and the 2nd and 4th hardly perceptible.

The type specimen is a female and has a flat semicircular ventral plate upon the pygidium.

Length 6·5 mm.; *breadth* 3·5 mm.

BURMA: Palon (*L. Fea*).

Type in the Genoa Museum.

Found in the forest. There is a second female specimen in the British Museum.

217. **Dasyvalgus viduatus**, sp. n.

Black and shining, scantily clothed with minute setæ, and decorated with two minute patches of decumbent ochreous scales placed transversely at the middle of each elytron.

The body is slightly elongate and the *legs* moderately slender, with the *hind tarsi* rather flattened and the first joint twice the length of the second. The sides of the *pronotum* are parallel behind, but a little irregular, and strongly rounded in front, and the hind angles are sharp but not acute. There are two well-marked dorsal carinæ extending almost from front to hind margin, a deep oblique fovea on each side at the middle, extending to the lateral margin, and four tufts near the hind margin. The *scutellum* is not long. The *elytra* are finely striated, slightly tufted at the shoulders, and separately rounded at the hind margins. The *terminal spiracles* are moderately prominent. The *front tibia* is broad and armed with five strong, broad and nearly equal teeth.

The unique type is a female and has a flat semicircular ventral plate to the pygidium.

Length 6·5 mm.; *breadth* 3·5 mm.

Burma.

Type in the British Museum.

This species very closely resembles *D. luctuosus*, Gestro, from which it differs by the more evenly toothed front tibia, longer tarsi and the more rounded sides of the prothorax. By analogy with *D. dohrni*, Kolbe, it seems probable that the unknown males of both these species are more brightly adorned than the female.

218. **Dasyvalgus militaris**, sp. n.

Black, with the last two segments of the abdomen scarlet above and beneath. The body is rather thinly clothed with yellow scales, but those at the hind angles of the prothorax, above and beneath, upon the mesosternal epimera, the front borders of the elytra and along the middle of the propygidium and pygidium are larger and closer, forming bright orange-coloured patches.

The *clypeus* is long, shining, strongly punctured, and feebly notched at the middle of the front margin. The sides of the *prothorax* are strongly rounded in front and nearly parallel behind, the hind angles are very obtuse and the base strongly rounded. The dorsal carinæ are gently curved, converging to behind the middle and from there strongly diverging. There is a pair of tufted tubercles near the middle and a pair on each side near the base. The *scutellum* is long and narrow, and the *elytra* are feebly striated, with the hind margins slightly curved. The terminal spiracles are moderately prominent, the *pygidium* and *propygidium* are closely and coarsely pitted, and the latter bears two tufts of black setæ near the middle of the hind margin. The *front tibia* has the 1st, 2nd, 3rd and 5th teeth very sharp and the 4th obtuse, and the basal joint of the *hind tarsus* is nearly twice as long as the 2nd.

♀. There is a small, flattened and closely setose, ventral area to the pygidium.

Length 8·5 mm.; *breadth* 4·5 mm.

Madras: Nilgiri Hills (*Sir G. F. Hampson*).

Type in the British Museum.

I have seen only the single female type specimen.

219. **Dasyvalgus stictopygus.**

Valgus stictopygus, *Gestro,* Ann. Mus. Genova*, (2) x, 1891, p. 857.

Black above and brown beneath, with the abdomen and legs reddish, the propygidium and pygidium bright red; decorated with spots or patches of pale yellow scales distributed as follows: one at each hind angle of the prothorax (above and beneath), two placed obliquely near the middle of each elytron, four in a

transverse line upon the propygidium (the two inner ones minute), three at the base and one at the apex of the pygidium, and a lateral series upon the sternum, hind coxæ and abdomen.

The body is moderately broad and only scantily clothed with fine setæ, but with a denser black patch at the middle of each elytron, four tufts near the hind margin of the pronotum, one at each shoulder and apical callus of the elytra, and two at the hind margin of the propygidium. The *clypeus* is long, entire, and strongly punctured. The *pronotum* is bell-shaped, with the sides a little divergent behind and the base strongly rounded. The dorsal carinæ are rather feeble. The *scutellum* is moderately long and the *elytra* are rather straight at the apical margin. The propygidial spiracles are sharply elevated and the two median tubercles very prominent and equidistant from the spiracles and from each other. The *pygidium* is closely pitted, but shining and scarcely setose. The *legs* are long, with the *front tibia* rather broad, the 4th tooth blunt and the rest very long and sharp, and the basal joint of the *hind tarsus* is twice as long as the second.

Length 6 mm.; *breadth* 3·5 mm.

BURMA: Bhamo (*L. Fea*).

Type in the Genoa Museum.

I have seen only the unique type specimen of this well-marked species.

220. Dasyvalgus tristis.

Valgus tristis, *Gestro,* Ann. Mus. Genova*, (2) x, 1891, p. 859.

Black and shining, scantily clothed with greyish setæ, which are denser in the depressions of the prothorax and in the two elongate spots placed side by side near the middle of each elytron.

The body is rather broad, with the prothorax much narrower than the elytra together. The *clypeus* is feebly bilobed. The sides of the *prothorax* are parallel behind and strongly rounded in front, the hind angles are very blunt and the base prominent in the middle. The dorsal carinæ are prominent in front and terminate in a pair of tufts near the middle of the pronotum, and there are four nearly equidistant tufts placed before the base. The *scutellum* is rather narrow and pointed. The *elytra* are rather feebly striated; each has a tuft at the shoulder and another at the extremity of the lateral costa, and the hind margins are separately rounded. The terminal spiracles are sharply prominent and there are two interposed tufts equidistant from the spiracles and each other. The *legs* are moderately long, the 1st, 2nd, and 3rd teeth of the *front tibia* long and sharp and the 4th and 5th short and broad. The 1st joint of the *hind tarsus* is nearly twice as long as the 2nd.

Length 4·5–5 mm.; *breadth* 3 mm.

BURMA: Karen Hills, 2700–3300 ft. (*L. Fea*).

Type in the Genoa Museum; cotypes in the British Museum.

Ten typical specimens which Dr. Gestro has kindly sent me for examination appear to be all males. They were found in flowers.

221. **Dasyvalgus carbonarius**, sp. n.

Black and shining, but finely rugose and excessively finely and sparingly clothed with dark setæ, with four small inconspicuous patches of erect setæ placed in a transverse line across the middle of the elytra, each patch immediately followed by a few greyish scales. The scales and setæ are easily lost.

The body is moderately broad and the legs are slender. The *head* is very closely punctured and the forehead slightly carinate. The *prothorax* is strongly and densely pitted and rugose, narrow, with the front angles acute, the sides gently rounded and a little contracted behind, and the hind angles slightly rounded off. There are two sharp, nearly parallel, dorsal carinæ extending from the front almost to the base, two short outer ridges near the middle, parallel to the first (but sometimes absent), and a short oblique ridge in each hind angle. The *scutellum* is a little elongate, and the *elytra* are irregularly striated, with a slight tuft of black setæ at each shoulder, and the hind margins are separately rounded. The terminal spiracles are very sharp and prominent, and there are two small distant tufts at the hind margin of the *propygidium*, which, with the *pygidium* and *lower surface* of the body, is closely covered with large annular punctures. The *front tibia* is armed with five equidistant teeth, the 1st, 3rd, and 5th a little longer than the others. The basal joint of the *hind tarsus* is as long as the two succeeding.

♂. The body is very short and compact and the tarsi are very long and slender.

♀. The body is elongate and the tarsi are rather short. The front tibia is shorter and broader, the terminal spiracles are less sharply produced, and the pygidium is very prominent, with the annular impressions larger and less crowded, and with a flattened and flanged ventral surface.

Length 6–8 mm.; *breadth* 3·5–4·5 mm.

Burma: Ruby Mines (*Doherty*); Sikkim: Karsiang (*Verschraeghen*).

Type in the British Museum; cotypes in colls. R. Oberthür and Baron P. de Moffarts.

I have seen a good series of males but only a single female, which, in spite of its different aspect, due chiefly to the prominent pygidium and very much shorter tarsi, I believe I am right in associating with them. It was brought by Doherty from the Ruby Mines, together with several males.

222. Dasyvalgus podicalis.

Valgus podicalis, *Blanch.*,* *Cat. Col. Mus. Paris*, 1850, p. 44.
Spilovalgus propygidialis, *Moser*,* *Berlin. Ent. Zeitschr.* 1904, p. 267.

Black and rather shining, with the elytra very deep chocolate-colour. There is a very scanty clothing of minute greyish setæ, the propygidium is densely covered with orange scales, and there are lighter yellow scales decorating the mesosternal epimera and the scutellum and forming a small spot at the middle of the basal margin of each elytron, and two more or less longitudinal marks placed transversely at the middle of each.

The body is rather broad, not tufted, and the legs are long and slender. The *clypeus* is long and not notched at the front margin. The *prothorax* is subcircular, with the sides and base uniformly rounded and the hind angles obliterated. The dorsal carinæ are nearly parallel and not sharp, and there is a broad oblique impression on each side behind the middle. The *scutellum* is long and narrow, and the *elytra* are striated, with the hind margins straight. The terminal spiracles are placed upon minute but sharply produced tubercles. The *pygidium* is extremely smooth and shining, but bears fine annular punctures. The *front tibia* is armed with five sharp equidistant teeth, and the *tarsi* are very long, the basal joint of the hind tarsus being about twice as long as the second.

Length 6 mm.; *breadth* 3·5 mm.

ASSAM (*teste* Moser).

Type in the Paris Museum; that of *propygidialis* in coll. Moser.

The known specimens of this species appear to me to be all males.

223. Dasyvalgus insularis, sp. n.

Black, with rather scattered greyish scales above and beneath, aggregated near the middle of each elytron to form a transverse patch, which is produced forwards interiorly along the second interstice.

The body is robust and the legs moderately long. The *clypeus* is shining and feebly bilobed. The sides of the *prothorax* are strongly rounded in front and nearly straight behind; the hind angles are obtuse and the base strongly rounded. The dorsal carinæ are nearly parallel and end in a pair of tufts near the middle of the disc, and there are four posterior tufts. The *scutellum* is long and narrow. The *elytra* are deeply striated, scarcely tufted, and separately rounded at the hind margins. The *propygidium* bears two slight tufts behind and the terminal spiracles are scarcely elevated. The *front tibia* is rather short and broad, the 1st, 2nd and 3rd teeth are long, the 4th broad and laminiform, and the 5th stout but prominent. The *tarsi* are not very long,

and the basal joint of the hind foot is about half as long again as the second joint.

Length 5–5·5 mm.; *breadth* 3–3·5 mm.

ANDAMAN IS. (*Capt. Wimberley*); NICOBAR IS. (*Roepstorff*).

Type in the British Museum.

224. Dasyvalgus trisinuatus.

Valgus trisinuatus, *Gestro,* Ann. Mus. Genova*, (2) x, 1891, p. 860.

Chestnut-red, clothed all over with coarse erect yellowish setæ, each elytron marked more or less evidently with a small black spot, having a few yellow scales adjoining it.

It is a small species, with the prothorax relatively rather large. The *head* bears two tufts upon the vertex. The sides of the *prothorax* are nearly straight, slightly converging to the front, where the angles are prominent. There are two strong, nearly parallel, dorsal carinæ, prominent at the front margin and terminating behind in two well-marked tufts behind the middle of the pronotum, which has also four tufts close to the base. The *scutellum* is not long. The *elytra* are rather deeply striated and each has a well-marked lateral costa, tufted at the end; the hind margins are nearly straight and the angles sharp. There are two rather distant tufts at the hind margin of the *propygidium* and the terminal spiracles are sharply prominent. The *pygidium* is very coarsely and shallowly pitted. The *front tibia* is rather broad and armed with five nearly equidistant teeth, the 1st and 3rd much longer than the rest. The first joint of the *hind tarsus* is more than half as long again as the second.

♂. The tarsi are much longer and more slender than those of the female.

Length 4 mm.; *breadth* 2·5 mm.

BURMA: Karen Hills (*W. Doherty*), Palon (*L. Fea*), Victoria Point (*W. Doherty*).

Type in the Genoa Museum.

The type specimen taken by Fea is a female. There are two males in the British Museum.

225. Dasyvalgus hystrix, sp. n.

Chestnut-red, clothed with yellow scales beneath, and above with intermixed yellow, orange and black scales, which are unevenly distributed and more or less erect. The yellow and orange scales are dense upon the back of the head, the pronotum, propygidium, pygidium, and the front and hind margins of the elytra, and the last have also a small patch of black scales near the middle of each and a few at the shoulders and apical calli.

The body is short and the legs are slender. The *clypeus* is strongly bilobed and the forehead crested. The *prothorax* is much narrower than the elytra together, the sides are strongly rounded

in front and a little contracted behind, the dorsal carinæ are not very strongly marked, and there are eight prominent tufts of orange-coloured setæ forming two transverse series. The *scutellum* is rather long. The *elytra* are rather indistinctly striated and separately rounded at the hind margins. The terminal spiracles are not sharp, but the *propygidium* bears two large yellow tufts at its posterior edge. The *front tibia* bears five well-developed teeth, the 1st, 2nd and 3rd being very long and sharp. The first joint of the *hind tarsus* is nearly twice the length of the second.

Length 5·5 mm.; *breadth* 3 mm.

ASSAM: Patkai Mts. (*Doherty*).

Type in the British Museum.

226. **Dasyvalgus fulvicauda**, sp. n.

Black, with the propygidium, pygidium and end of the abdomen beneath red; clothed with minute dark setæ and yellow scales, the latter forming four longitudinal crests at the base of the pronotum and a patch beneath each hind angle, and being rather closely aggregated at the anterior and sutural parts of the elytra and upon the propygidium and pygidium.

The body is rather short and the legs are slender. The *head* and *pronotum* are deeply and closely pitted, the head has a transverse crest upon the vertex and the pronotum has two rather widely separated carinæ, ending in a pair of tufts behind the middle, a short anterior carina between the two former and a short outer one on each side near the middle; the sides are strongly rounded in front and the hind angles rounded off. The *scutellum* is narrow and pointed. The *elytra* are rather indistinctly striated, the shoulders and apical calli are tufted, and the hind margins are separately rounded. The terminal spiracles are moderately prominent, and the *propygidium* bears a pair of rather distant tufts at the hind margin. The *front tibia* has the 1st, 2nd, and 3rd teeth long and acute and the 4th very obtuse. The first joint of the *hind tarsus* is twice the length of the second.

Length 4·5–5·5 mm.; *breadth* 2·5–3 mm.

BURMA: Karen Hills (*Doherty*).

Type in the British Museum.

The five specimens examined appear to be all males.

227. **Dasyvalgus ovicollis**, sp. n.

Brick-red, with the sternum dark and the pygidium and propygidium densely, the lower surface, pronotum, and scutellum less densely, clothed with ochreous scales, and the elytra decorated as follows:—a dense patch of ochreous scales, more or less completely divided into two, at the middle of each, with similarly dense patches of black scales immediately adjoining before and behind, the yellow scales also occurring more irregularly at the front and hind margins and near the suture. There are small

black tufts upon the humeral and apical calli, and orange-coloured tufts placed, two upon the dorsal carinæ of the pronotum, two near the hind angles and two at the hind margin of the propygidium.

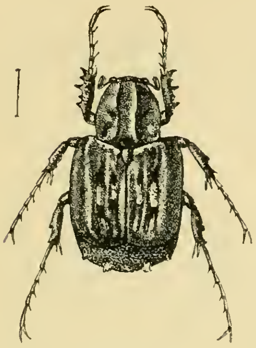

Fig. 56.
Dasyvalgus ovicollis.

The body is moderately broad and the legs are long. The *prothorax* is ovate, gently and continuously rounded at the sides and base, with the hind angles almost entirely obliterated and the front angles not much produced. There are two long and nearly parallel dorsal carinæ. The *scutellum* is very long, narrow and blunt. The *elytra* are separately rounded at the hind margins. The terminal spiracles are sharp but not long. The 1st, 2nd and 3rd teeth of the *front tibia* are very sharp, the 4th obtuse, and the 5th strong but not acute. The *tarsi* are very slender, and the basal joint in the hind foot is as long as the two succeeding ones.

I have only seen males.

Length 6–7 mm.; *breadth* 3–4 mm.

BURMA: Ruby Mines, 3600–7200 ft. (*Doherty*).

Type in the British Museum; cotypes in coll. R. Oberthür.

228. Dasyvalgus penicillatus.

Valgus penicillatus, *Blanch.*,* *Cat. Col. Mus. Paris,* 1850, p. 45.

Black, clothed beneath, rather uniformly but not densely, with minute yellow scales, and above with larger scales closely packed upon the propygidium and pygidium and less uniformly upon the pronotum and elytra, where they are interspersed with spots and patches of dark scales and setæ. The yellow scales of the elytra are most numerous near the suture and in a patch placed behind the middle of the outer edge, and there is a round patch of dark scales on each side of the suture before the middle.

The body is a little elongate and the legs are slender. The *clypeus* is notched at the front margin and there are two tufts placed transversely upon the forehead. The *prothorax* has the sides strongly rounded in front, nearly parallel behind, the hind angles distinct and the base regularly rounded. The dorsal carinæ are parallel, moderately sharp in front, and terminate in two strong tufts behind the middle; there are also four tufts near the base. The *scutellum* is long and narrow, and the *elytra* are tufted at the shoulders and apical calli and separately rounded at the hind margins. The terminal spiracles are only slightly prominent, and the *propygidium* bears a pair of rather distant yellow tufts at its hind margin. The *front tibia* is moderately long, the 1st and 3rd teeth very long and sharp, and the others

rather small. The *tarsi* are long, and the basal joint of the hind tarsus is twice as long as the second.

Length 5·5–6 mm.; *breadth* 3 mm.

PUNJAB: Kulu.

Type in the Paris Museum.

I have seen five specimens, of which only one (kindly presented to the British Museum by Baron Paul de Moffarts) is well preserved and has a precise locality. All are apparently males. Another example is in the Oxford Museum.

229. **Dasyvalgus minimus**, sp. n.

Very deep brown, approaching black, with the clypeus, legs and lower surface of the body reddish, clothed above and beneath with pale ochreous scales, which are very densely packed upon the propygidium and pygidium, moderately closely upon the lower surface, and rather evenly, but not closely, distributed upon the head and pronotum. The elytra bear longitudinal rows of scales, separated by the striæ, those adjoining the suture being broad and close and spreading outwards a little at the front and hind borders.

The body is elongate and rather parallel-sided, and the legs are not very long. The sides of the *prothorax* are nearly straight, feebly curved and very slightly contracted in front, with the hind angles rather blunt. The dorsal carinæ are strong, parallel, and very prominent in front, and end in slight tubercles near the middle of the disc. The *scutellum* is rather narrow and acute, and the *elytra* bear minute tufts of setæ at the shoulders and are separately rounded at the hind margins. The *propygidium* is broad and prominent, with two strong tubercles at its hinder margin, but with the terminal spiracles scarcely elevated. The *front tibia* is rather broad, and armed with five prominent and nearly equidistant teeth, the 1st and 3rd very long. The *tarsi* are moderately long, with the basal joint of the hind foot nearly twice the length of the second.

I have found no sexual difference in a good series of specimens.

Length 4·5 mm.; *breadth* 2 mm.

BURMA: Ruby Mines, 5500–7500 ft., Karen Hills (*Doherty*).

Type in the British Museum.

This is the smallest known Indian Cetoniid beetle. It is closely related to *Dasyvalgus penicillatus*, but in addition to its smaller size, is more elongate, with the sides of the prothorax less rounded in front and the terminal spiracles scarcely prominent.

230. **Dasyvalgus addendus.**

Valgus addendus, *Walker*,* *Ann. Nat. Hist.* (3) iii, 1859, p. 56.

Testaceous red, clothed with yellowish scales which are rather dense on the lower surface, the propygidium, and pygidium, rather scattered on the pronotum and arranged in rows on the elytra,

but most closely packed at the front, inner and hind borders. There are traces of a dark spot at the middle of each elytron, perhaps conspicuous in well-preserved specimens.

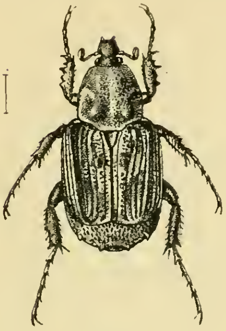

Fig. 57.
Dasyvalgus addendus.

It is a small species with long slender legs. The *prothorax* is rather long, with the sides very gently curved and converging to the front angles, which are acute: it is strongly grooved longitudinally in the middle, but scarcely carinate. The basal margin forms a very obtuse angle in the middle. The *scutellum* is rather large, moderately broad, and smooth and shining. The *elytra* are rather deeply striated and separately rounded at the posterior margin. The terminal spiracles are moderately prominent and there are two slight and rather distant tufts of setæ at the hind margin of the *propygidium*. The *front tibia* is moderately broad, with the 1st and 3rd teeth long and slender, and the 2nd, 4th and 5th very short and blunt. The basal joint of the *hind tarsus* is a little longer than the second.

Length 4 mm.; *breadth* 2 mm.

CEYLON.

Type in the British Museum.

231. **Dasyvalgus kanarensis**, sp. n.

Chestnut-red, clothed closely and uniformly beneath, and irregularly above, with yellowish scales. There is a patch of dark scales before the middle of each elytron, and the light scales are densest immediately before and behind this and at the front, inner and hind borders of each elytron. The pronotum is fairly well covered and bears two median and four basal tufts of erect setæ, and the propygidium and pygidium are densely scaly, the former bearing at its hind margin two strong tufts of a darker colour.

The body is slightly elongate and the legs are moderately slender. The *clypeus* is narrow and entire. The *pronotum* has the sides well rounded in front and very little diverging behind, the posterior angles rounded off and the base regularly curved; there is a deep median longitudinal groove, but its sides are not strongly carinate. The *scutellum* is smooth, shining, and rather long; and the *elytra* are deeply striated, with the hind margins separately rounded. The terminal spiracles are very prominent but blunt. The *front tibia* is stout and its 1st and 3rd teeth very long and sharp, the 2nd and 5th strong and the 4th small but moderately sharp; there is a very deep notch between the 2nd and 3rd teeth. The first four joints of the *hind tarsus* are nearly equal in length, but the basal joint is stouter.

Length 4·5–5·5 mm.; *breadth* 2·5–3 mm.
BOMBAY: Kanara (*T. R. D. Bell*).
Type in the British Museum; cotypes in coll. H .E. Andrewes.

Genus CHARITOVALGUS.

Charitovalgus, *Kolbe, Stettin. Ent. Zeit.* 1904, p. 20.

TYPE, *Valgus pulcher*, Kraatz (Malacca, Borneo, and Sumatra).
Range. North India, Burma and the Malayan Region.

Body long and narrow, clothed with close-lying scales. Legs stout, with the tarsi rather slender and flattened: front tibia armed with three acute teeth, followed by one or two very slight and blunt ones; middle and hind tibiæ short and thick, smooth, without spines or hairs; hind femora rather long and slender; first joint of the hind tarsus as long as, or longer than, the second and third together. Prothorax rather narrower than the elytra together, with two longitudinal carinæ. Elytra straight at the extremity and the sutural angles right angles. Terminal spiracles situated upon very long and sharp tubercles or spines. Pygidium not much broader than long, rather flat.

♀. Tarsi shorter and thicker than in the male, elytra shorter, abdomen more exposed above and produced at its extremity into a slender style.

Key to the Species.

1 (2)	Front tibiæ long and slender	*pictus*, Hope, p. 246.
2 (1)	Front tibiæ short.	
3 (4)	Scutellum large	*longulus*, Gestro, p. 247.
4 (3)	Scutellum small	*andamanicus*, Kolbe, p. 248.

232. Charitovalgus pictus. (Plate II, figs. 10 & 11.)

Acanthurus pictus, *Hope,* Gray's Zool. Miscellany*, 1831, p. 24.
Valgus pictus, *Burm., Handb. Ent.* iii, 1842, p. 721.

Black or deep chocolate-brown, clothed with scales of the same colour, with grey scales upon the legs, lower surface, the sides and middle of the pronotum, the scutellum and transverse bands common to both elytra at the base, middle and apex, the middle band pointing obliquely forward at each end.

In the male the propygidium, pygidium, the middle of the abdomen, and the sutural margins of the elytra (dilating anteriorly to the shoulders) are covered with bright orange-coloured scales. These are entirely absent in the female, which has the middle and sides of the propygidium and pygidium, in addition to the parts already described, decorated with grey scales.

It is a large species and very elongate, with slender legs. The sides of the *prothorax* are coarsely serrated and distinctly contracted behind the middle. The dorsal carinæ are strong and slightly contracted and tuberculated a little behind the middle;

the hind margin is rather strongly curved. The *scutellum* is very long and narrow. The *front tibia* is very slender and armed with five teeth, of which the 1st, 3rd and 5th are sharp, and the 2nd and 4th small and blunt, the interval between the 3rd and 4th teeth being long.

♂. In addition to the difference of pattern already described all the tarsi are extremely long in the male.

♀. The tarsi are much shorter, and in the two posterior pairs the basal joint is as long as the three succeeding joints together. The caudal spine is simply acuminate.

Length 8 mm.; *breadth* 3·5 mm.

NEPAL (*Maj.-Gen. Hardwicke*).

Type in the British Museum.

Only a single pair is known, the originals of the descriptions of both Hope and Burmeister. The first is so fragmentary as hardly to merit the name of description, and the second was drawn up from information supplied by Westwood. Burmeister was mistaken in believing the type to be in the Oxford Museum.

233. Charitovalgus longulus.

Valgus longulus, *Gestro,* Ann. Mus. Genova,* (2) x, 1891, p. 855.

Dark brown, with the legs and a round prominence near each hind angle of the pronotum deep red; clothed with fine scales, which are deep chocolate-colour, except upon the legs, at the angles of the pronotum, the front margins of the elytra, and the sides of the propygidium, pygidium, sternum and abdomen, where they are buff-coloured. There is a fine white semicircular line crossing the elytra at the middle and curving upwards towards the shoulders.

The sides of the *pronotum* are almost straight and gently diverge from the front to the base, which is strongly rounded. The dorsal carinæ are sharp and nearly parallel, and terminate abruptly near the middle of the pronotum. There is a pair of sharp tubercles between the carinæ and the basal margin, and a shining red area extends from each of these to the hind angle. The *scutellum* is rather long and acute at the apex. The *elytra* are very flat above and straight at their extremities. The *front tibia* is short and broad, with the 1st and 3rd teeth sharp, the 2nd and 5th broader and blunter, and the 4th obsolete.

The female is unknown.

Length 6 mm.; *breadth* 3 mm.

BURMA: Karen Hills, 2700–3300 ft. (*L. Fea*).

Type in the Genoa Museum.

I have seen only the unique type specimen.

234. Charitovalgus andamanicus.

Charitovalgus andamanicus, *Kolbe, Stettin. Ent. Zeit.* 1904, p. 22.

Deep chestnut-colour, clothed with scales varying in colour from almost white to ochre and from that to deep chocolate. The medial basal part of the pronotum, the scutellum, and the middle of each elytron are dark, and the elytra are decorated with whitish scales along the anterior margins, the suture, and a backwardly-curved transverse line upon the inner half of each at the middle. The propygidium, pygidium, abdomen and legs are clothed with pale ochreous scales.

The *pronotum* is about as long as it is broad, with the sides serrated and not strongly curved, and the base regularly rounded. The dorsal carinæ are rather far apart and diverge slightly behind, and there are four conical elevations placed in a line parallel with the posterior margin. The *scutellum* is small. The *elytra* are minutely toothed at the shoulders and their lateral costæ are rather spinose behind. The *front tibia* is rather short and broad, with the 1st, 3rd and 5th teeth strong and sharp, the 2nd smaller and the 4th scarcely traceable. The *tarsi* are rather long.

♂. The hind tarsi are nearly three times the length of the tibiæ.

♀. The hind tarsi are more than twice the length of the tibiæ. The caudal spine is bent downwards at the apex and tridentate, the lateral teeth being placed a little behind and beneath the middle one. The posterior median part of the pronotum, the scutellum, and the middle of the elytra are black or almost black.

Length 5–6 mm.; *breadth* 2·5–3 mm.

ANDAMAN IS.

Type in the Berlin Museum.

Division III.—TRICHIINI.

The members of this group are generally characterised by a less compact build and a softer condition of the integuments than is found in other Cetoniinæ. The legs are generally long and slender and the whole body is capable of freer movement. The mouth is suctorial and its various parts do not essentially differ from those of the Cetoniini. The mesosternal epimera do not rise into the angle between the shoulders of the elytra and the pronotum, and the hinder part of the latter is not closely co-adapted to the elytra. The front of the elytra and scutellum form a ridge against which the hind margin of the pronotum is brought to rest. When drawn forward the thorax is thus more freely movable than in the more typical Cetoniinæ. The elytra cover the sides of the abdomen and are not at all cut away behind the shoulders and they have therefore to be raised in the usual manner when the wings are used.

The larva of the common European representative, *Trichius fasciatus*, L., is closely like those of the true Cetoniini. This genus is the only one represented in our region.

Genus **TRICHIUS**.

Trichius, *Fabricius*, *Ent. Syst.* i, 2, 1792, p. 118; *Burm.*, *Handb. Ent.* iii, 1842, p. 754; *Serville*, *Encycl.*, *Méth.*, *Hist. Nat.* x, 1825, p. 703; *Lacord.*, *Gen. Col.* iii, 1856, p. 564.

Type, *Trichius fasciatus*, L. (Europe).

Range. Europe, Continental Asia and Japan.

Body rather loosely articulated, not compact, with long and slender legs. Eyes large and prominent and clypeus long, slightly bilobed. Antennæ rather long. Prothorax narrow, not emarginate nor distinctly lobed before the scutellum. Scutellum very short, with curvilinear sides. Elytra broad, not reduced at the sides, with the hind margins separately rounded. Mesosternum not prominent in front. Front tibiæ bidentate. Hind tibiæ truncate at the end. Mandible feebly chitinised, with the outer lobe long, thin and straight. Maxilla long, without teeth, thickly fringed with hairs. Mentum long, deeply notched in front, with the palpi rather short.

♂. The abdomen is arched beneath, and the hind tarsus and the club of the antenna are generally longer than in the female.

♀. There is a strong spinose ridge beyond the middle of the middle tibia.

The form and pattern are very subject to variation, and sometimes strikingly different in the two sexes, but there is no distortion of the middle tibiæ of the male as in the genus *Gnorimus*.

The European representatives of the genus live during the early stages in decaying tree-stumps.

Key to the Species.

1 (10)	Hind angles of prothorax rounded.	
2 (9)	Upper surface not metallic.	
3 (8)	Prothorax subcircular.	
4 (5)	Elytra decorated with oblique white lines	*jansoni*, Gestro, p. 250.
5 (4)	Elytra decorated with pale spots.	
6 (7)	Numerous white spots on each elytron	*alboguttatus*, Moser, p. 251.
7 (6)	Two white spots on each elytron..	*discolor*, Jordan, p. 251.
8 (3)	Prothorax strongly transverse	*festivus*, sp. n., p. 252.
9 (2)	Upper surface more or less metallic	*ornatus*, Jordan, p. 253.
10 (1)	Hind angles of prothorax right angles	*costipennis*, Jans., p. 254.

One species, *Trichius dombrowskii*, Nonfried, has not been identified and is therefore not included in the above key.

235. Trichius jansoni.

Trichius jansoni, *Gestro*,* *Ann. Mus. Genova*, (2) x, 1891, p. 854, pl. 2, fig. 12.

Black and opaque, with the scutellum, the middle of the pygidium and the legs shining, and decorated with white markings, consisting of a narrow marginal line to the pronotum, absent in front and interrupted in the middle behind, a short line upon each elytron bordering the scutellum, a very short transverse line behind the shoulder, an oblique line extending from before the middle of the inner margin, where it is slightly hooked, to behind the middle of the outer margin, and a small transverse apical patch. There is also a large white patch on each side of the pygidium, and the sides of the sternum and hind coxæ and the greater part of the abdomen are of the same colour.

The *head* is finely rugose, with the *clypeus* as long as it is broad and slightly bilobed. The *pronotum* is strongly and rugosely punctured, and nearly circular in outline, with the hind angles entirely absent but the front angles rather prominent. The *scutellum* is almost semicircular and strongly punctured, with a smooth median carina. The *elytra* have rows of punctures deeply impressed in front, with the interstices elevated. The *pygidium*, *metasternum* and *abdomen* are rugose and clothed with short yellowish setæ. The *legs* are long and slender.

♂. The club of the antenna is as long as the footstalk.

Length 10·5 mm.; *breadth* 4·5 mm.

Burma: Karen Hills, 2700–3300 ft. (*L. Fea*).

Type in the Genoa Museum.

Only a single male specimen is at present known.

236. Trichius alboguttatus.

Trichius alboguttatus, *Moser,* Ann. Soc. Ent. Belgique*, 1905, p. 215.

Black, with the clypeus, prothorax, scutellum, elytra, a broad line along the middle of the pygidium, and the legs deep crimson in the ♂, and the femora and tibiæ only in the ♀; decorated with the following white markings:—an incomplete narrow marginal line on each side of the prothorax (in the ♂), a spot on each mesosternal epimeron, six spots at the median part of each elytron (viz., two near the outer margin, two towards the inner margin, and two along the middle line) and usually one adjoining the scutellum and one in the apical angle of each (at least in the ♂), and an elongate patch on each side of the pygidium (usually divided in the ♀). There are also generally patches, in the ♂ at least, on the metasternum, the front and hind coxæ, and two rows on each side of the abdomen beneath.

It is a small species, entirely opaque above and very thinly clothed with yellow setæ beneath. The *head* and *pronotum* are rugosely punctured, the *clypeus* as long as it is wide, with the sides strongly curved and the front margin bilobed. The *prothorax* is broader than it is long, slightly attenuated in front, with the margins irregularly rounded and a broad furrow along the middle of the disc. The *scutellum* is strongly punctured, with a smooth median carina, and nearly semicircular in shape. The *elytra* bear impressed rows of annular punctures, the *pygidium* is finely strigose, the *metasternum* entirely rugose and the *abdomen* coarsely punctured. The *legs* are very slender and the *front tibiæ* bidentate.

In addition to the different colouring described above, the male has the prothorax less transverse than the female, the hind tarsi longer, and the abdomen rather concave beneath. The club of the antenna is about as long as the footstalk in the female, and nearly twice as long in the male,

Length 10–12 mm.; *breadth* 3–3·5 mm.

Assam: Khasi Hills.

Type in coll. Moser.

237. Trichius discolor. (Plate II, figs. 8 & 9.)

Trichius discolor, *Jordan, Ann. Nat. Hist.* (6) xv, 1895, p. 219.

Black, with the antennæ, legs, clypeus, prothorax and elytra more or less testaceous red. The pronotum is decorated with a white marginal line, interrupted in the middle, and (usually) a small discoidal white spot on each side; each elytron with a white spot in the middle and another placed a little behind and outside of the first. The colouring is exceedingly variable, but the femora,

tibiæ and tarsal joints are ringed with black at the extremities; the forehead is black: the pronotum red, with a large black patch on each side, or entirely red; and the elytra black, with an anterior and posterior red mark on each, or red, with the margins and a median patch upon each black.

The form is small and slender and the legs long. The *head* is finely punctured, with the *clypeus* about as long as it is broad and gently emarginate in front. The *pronotum* is coarsely punctured, slightly grooved along the middle and subcircular in shape, with the sides straight and convergent in front, and the front angles sharp. The *scutellum* is very short, nearly semicircular and slightly punctured. The *elytra* are coarsely punctate-striate and the *pygidium* is very sparsely punctured. The *front tibiæ* are bidentate, and the *antennal club* is long in both sexes, very long in the male.

The upper surface is entirely opaque in the male, but the pronotum, scutellum and elytra are shining in the female. The pygidium of the male bears a large white patch on each side and the greater part of the sternum and abdomen is also white. The prothorax is rather more elongate in the same sex, the hind tarsi are longer and the abdomen is strongly arched beneath.

Length 10–11 mm.; *breadth* 4·5 mm.

ASSAM: Khasi Hills.

Type in coll. Moser.

238. **Trichius festivus**, sp. n.

♂. Black, with the clypeus, antennæ, legs, scutellum and a marginal band encircling each elytron bright orange; decorated with pale yellow markings as follows:—a line encircling the pronotum, a longitudinal median line extending from near the front margin to the base, and a <-shaped mark on each side, a spot common to both elytra immediately behind the scutellum, a transverse spot before the middle of each and a minute apical spot near the suture, a large patch on each side of the pygidium (the two connected at the base), and the greater part of the lower surface and coxæ. The whole upper surface is opaque and the head, pronotum, pygidium and lower surface are clothed with pale yellow hairs.

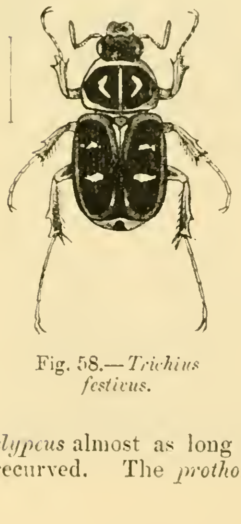

Fig. 58.—*Trichius festivus.*

The body is rather broad and flat. The *head* is rugosely punctured, with the *clypeus* almost as long as it is broad, notched in front and a little recurved. The *prothorax* is strongly transverse, distinctly and

evenly punctured, with the sides strongly and the base gently curved and the hind angles very bluntly prominent; there is an elevated posterior margin extending the whole width of the base. The *scutellum* is very short and feebly punctured. The *elytra* are punctate-striate and the *pygidium* thinly punctured. The club of the *antenna* is about as long as the footstalk, the *front tibia* is acutely bidentate and all the *tarsi* are long.

The female is unknown.

Var. *funebris*, nov. The body and legs are entirely black, with the pale yellow markings as described above.

Length 12 mm.; *breadth* 6·5 mm.

BURMA: Ruby Mines.

Types in the British Museum.

239. **Trichius ornatus.**

Trichius ornatus, *Jordan, Ann. Nat. Hist.* (6) xv, 1895, p. 218.

Deep metallic green, more or less coppery on the head and lower surface and opaque above, with the antennæ, legs and a broad line extending from the shoulder to the apex of each elytron bright orange; decorated with pale yellow markings consisting of a narrow longitudinal line at the middle of the pronotum, and a marginal line and a minute median spot on each side, the scutellum, a longitudinal line on each elytron near the suture, starting from the base but not quite reaching the posterior edge, a basal, an apical, and three lateral spots upon each, and large patches on each side of the pygidium, sternum and abdomen.

The body is moderately slender and the legs are very long, the *front tibia* armed with two teeth at the extremity and slightly serrated beyond them. The club of the *antenna* is shorter than the footstalk in both sexes. The *head* is rugosely punctured, and the *clypeus* a little longer than it is broad and not very deeply notched at the front margin. The *pronotum* is strongly punctured, lightly grooved along the middle and rather broader than it is long, with the front angles acute, the hind angles very bluntly prominent and the sides and base gently curved. The *scutellum* is shortly triangular. The *elytra* are strongly punctate-striate, the *pygidium* finely rugose, and the *metasternum* and *abdomen* punctured and clothed with a short yellow pubescence.

♂. The antennæ and legs are more slender than those of the female, the prothorax is broader at the base and the abdomen is strongly arched. The vertex of the head and the pronotum are generally more opaque, and there are often additional pale markings upon the vertex, pronotum and elytra.

Length 12–17 mm.; *breadth* 5·5–8 mm.

ASSAM: Khasi Hills.

Type in coll. Moser.

240. Trichius costipennis.

Gnorimus costipennis, *Janson, Notes Leyden Mus.* xii, 1890, p. 128.
Gnorimus viridis, *Jordan, Novit. Zoolog.* 1894, pp. 486, 692, pl. 13, fig. 3.

Deep metallic green, thickly clothed beneath, except at the middle of the abdomen, with a short greyish-yellow pubescence, which also forms a narrow line at each side of the pronotum (continued a little round the posterior angles) and three small patches at the base of the pygidium.

It is a very large species and rather stoutly built and convex. The *head* is densely and rugosely punctured and, together with the pronotum and the external margins of the elytra, bears very minute setæ. The *clypeus* is about as long as it is broad and deeply incised in front. The *pronotum* is strongly punctured, about as long as it is broad, much narrowed in front but scarcely at all behind, with all the angles sharp, the front ones acute and the posterior ones right angles, the sides sinuated and the base gently curved. The *scutellum* is broad and bears a few punctures. The *elytra* are deeply sulcate, the sulci being rugose at the bottom, and the lateral and apical margins are finely rugose. The *pygidium* is rather feebly rugulose. The *mesosternum* forms a short compressed vertical lamina between the middle coxæ. The club of the *antenna* is short in both sexes and the *legs* are moderately, but not extremely, slender.

♂. The front tibia is simple, armed only with a blunt apical prolongation, and the abdomen is channelled along the middle, with a median line of pubescence.

♀. The front tibia is feebly bidentate, the abdomen is convex and bare along the middle, and the pygidium has a slight depression at the apex, which is coarsely granulated.

Length 21–24 mm.; *breadth* 11–12 mm.

ASSAM: Manipur (*Doherty*).

Type in coll. O. E. Janson; cotypes in the British Museum; type of *viridis* in coll. Moser.

I have not been able to identify the following species, and therefore give a translation of the original description.

241. Trichius dombrowskii.

Trichius dombrowskii, *Nonfried, Stettin. Ent. Zeit.* lxvii, 1906, p. 224.

"Dull metallic green above, shining coppery red beneath. *Clypeus* narrow in front, bilobed, with the lateral margins rounded. *Pronotum* closely and coarsely punctured on the disc, almost rugosely towards the sides, lightly channelled along the middle, the base of the scutellum also bearing an impression, consisting of closely set punctures, and opaque; colour green, the sides having

a white margin, with a spot of the same nature almost in the middle. *Scutellum* broad, bluntly triangular, carinate along the middle, closely and coarsely strigose except at the margins. *Elytra* dull green, white-spotted, the sutural stria broad, the dorsal striæ faint, smooth, the interstices bearing slight curved punctures. The ten white spots are distributed as follows:—1, 2 and 1 adjoining the sutural stria, 1 at the middle of the base, 1 rather narrow one beneath the last, 1 on the humeral callus, 1 beneath it, 1 at the middle of the lateral margin, and 1 in the apical angle. *Pygidium* coppery red, closely shagreened, with a large round white spot on each side. *Lower surface* shining, strigose, clothed with fine yellowish hair. Sides of the abdominal segments white-spotted. *Legs* slender, coppery red; front tibiæ bidentate.

"*Length* 16 mm."

ASSAM: Jafflong, in Manipur.

Type in coll. Nonfried.

Subfamily DYNASTINÆ.

The Subfamily Dynastinæ, although not one of the largest, is one of the best known groups of Lamellicornia, including many of the largest and most striking of the beetles. It is very scantily represented in the Oriental Region and its Indian representatives number only forty-six out of a total of about a thousand described species. Although closely related to the Cetoniinæ, one of the most remarkable for brilliant colouring among the groups of Coleoptera, this on the contrary is one of the most sombre. This, as would be supposed, implies a notable difference of habit, for, whilst the foregoing Subfamily is in general conspicuously diurnal, the Dynastinæ generally remain in concealment by day and emerge at night, when decorative effects could have no significance. The majority of species are black, and almost the only departure from the rule occurs when by some deficiency of the black pigment shades of yellow, brown or red are produced. Even within these limits, nothing in the nature of a pattern is found except in an American genus, *Cyclocephala*, and a few other American species. These exceptional members of the group are found to have exceptional habits, being entirely diurnal and frequenting flowers like many of the Cetoniinæ. A single Indian species, *Chalcosoma atlas*, the largest of Indian beetles and one of the most striking, has a slight greenish metallic lustre and is almost unique in that respect.

The group is chiefly remarkable as that in which sexual dimorphism appears in some of its most striking phases. Horns of relatively enormous size occur, chiefly in the males, upon the head and thorax; and as some of the species in which they attain their maximum development are also among the largest existing insects, they have naturally always attracted quite exceptional attention.

Structure.

Practically all the Dynastinæ are winged, and in flight the wings are spread in the usual way, so that the structure of the elytra and the correlated parts of the thorax is not of the peculiar type found in the Cetoniinæ. The scutellum is always exposed, small and bluntly triangular, and the elytra completely cover the abdomen, except the pygidium and generally part of the propygidium. The latter often bears a vocal apparatus, consisting of fine transverse ridges capable of being drawn like a file across the sharp inturned posterior edge of the elytra by the movement of the abdomen. The ridges are sometimes very long and cover the greater part of the segment, which, moreover, may be considerably

enlarged at the expense of the pygidium, as in the genus *Dipelicus* (see fig. 76); in another group (*Heteronychus*, etc.) the ridges are restricted to two longitudinal lines near the middle of the propygidium. Some species, which do not possess the apparatus in either form, nevertheless produce a considerable volume of sound by movements of the abdomen similar to those by which the stridulating ridges are brought into operation. Air is apparently imprisoned between the elytra and the back and then expelled with some force, producing a hissing sound. In the large and common *Xylotrupes gideon* this has often been observed.

The occurrence of horns, even of the largest size, upon the head is not accompanied by a corresponding development of the head itself, which, on the contrary, is relatively smaller than in the CETONIINÆ. The clypeus is generally small and the eyes less prominent than in the previous group, being divided in front by a ridge which forms a lateral extension of the clypeus. The antennæ are inserted beneath this ridge and consist of ten joints, of which three form the club. They show little variation throughout the Subfamily, nor do they appreciably differ in the two sexes.

The mandibles are much more developed than in the CETONIINÆ and, except in certain forms not represented within the Indian area, are always in part visible from above (*i. e.* produced beyond the margins of the clypeus) and generally notched or lobed at the outer edge. The maxillæ are generally furnished with several sharp strong teeth and closely fringed with stiff hairs. The mentum and ligula are fused together and the labrum small, membranous and concealed.

The legs are inserted in a rather different manner to that found in the CETONIINÆ. The front coxæ are more deeply imbedded in the thorax, broad and transverse, and the prosternum forms a process behind them which is sometimes free and columnar, sometimes inclined and in close contact with the coxæ. All the coxæ are contiguous in the middle, so that the mesosternum is divided from the metasternum and the two parts do not produce in the middle a process pointing forward as in most CETONIINÆ and many RUTELINÆ and MELOLONTHINÆ. The legs differ considerably in form. Some genera, apparently with more than the normal digging powers, have them extremely short, with very thick and muscular femora and tibiæ, the latter generally trumpet-shaped and their wide extremities fringed with very strong spines, and the tarsi tapering and very slight at the end. The rest have the legs of moderate length, and the tarsi slender and uniform. The front tibia has always three stout external teeth and there are sometimes four or more, in which last case smaller teeth appear between the three primary ones. The claws are always simple, symmetrical and immovable, except upon the fore-feet of the males in certain genera.

Sexual Dimorphism.

The existence of horns in the male, which in the previous group is of exceptional occurrence, here becomes characteristic and in some of the large species these appendages reach a size unequalled in any other insects. They usually take the form of a slender recurved horn upon the front of the head, sometimes toothed or bifurcated, and generally represented only by a slight tubercle in the female; and upon the pronotum one, two or more processes directed forwards or upwards, and often rising from the margin of a dorsal cavity. Such a cavity may be present without any processes and it may exist in both sexes but differ in shape, as in *Eophileurus chinensis*. In the very largest DYNASTINÆ, in which the armature of the male attains its maximum development, there is no cavity, but the pronotum of the male on the contrary is much elevated or humped. In the smallest forms again, as in the genus *Heteronychus*, there is no trace of such a sexual armature.

Although generally distinctive of the male, the possession of horns is not invariably so, for in some cases, as in *Oryctes rhinoceros*, the well-known Cocoanut Beetle, both sexes are horned, but some distinctive difference of form is always discoverable if a sufficient series of specimens is studied. There is no group of insects in which it is more necessary that a good series should be examined in order to obtain a correct idea of the characteristic features of a species. In the early days of Entomology, when only occasional specimens of these insects had yet reached Europe, the variability of the armature and even its sexual character was unrecognised, and almost every specimen which came into the hands of Linnæus, Fabricius and their contemporaries was regarded as the representative of a different species and given a distinctive name. It has not been considered necessary to include all these names in the present work.

Remarkable anomalies occur in some species in the development of the horns, as seen by a comparison of specimens of different size. Horns which at their highest development are slender and simple may in minor examples be knobbed, forked or toothed in various inexplicable ways; and it was almost inevitable that *Chalcosoma atlas*, for instance, when known only from a few examples brought from different localities should be considered to form several distinct species. In the structure of the legs there are two opposite tendencies characterising the males of different groups of genera. In one, containing the most striking forms, the legs become elongated to a greater or less extent, while in another the front legs, and especially the tarsi, are contracted, the others remaining like those of the female. In the latter case the anterior claws are also modified in the males, the inner claw being thickened and bent and frequently giving off a broad tooth. This formation is never found in the CETONIINÆ but in some degree it is almost general in the RUTELINÆ. In other genera of DYNASTINÆ, which occupy an intermediate position, the

legs are alike in the two sexes, and in some the whole aspect is identical. There is a slight difference, however, which is almost invariable throughout the subfamily and serves to determine the sex when more obvious distinctions are wanting or doubtful. The last ventral segment is more or less angular at the extremity in the female, the angle coinciding with the apex of the last dorsal segment or pygidium: while in the male this segment is excised at the apex, leaving an interval between it and the apex of the pygidium filled by a membrane. The pygidium itself is often extended and inturned in correspondence with this conformation in the male.

Habits and Metamorphoses.

The DYNASTINÆ being practically confined to the warm regions of the earth and almost all of singularly retiring habits, our knowledge of their metamorphoses and modes of life is as yet exceedingly scanty. With the exception of the flower-haunting CYCLOCEPHALINI of Tropical America, they appear to be practically all nocturnal or crepuscular, lying hidden by day beneath the ground or in dark recesses. For this reason, combined with the sombre and inconspicuous colouring which is the usual accompaniment of such a mode of life, they are not easily found, although generally abundant, and in very few cases have their early stages been traced. The only genus in which anything approaching complete information is available is *Oryctes* (the Rhinoceros beetles), of which not only are the species exceedingly abundant, but one of them (*Oryctes nasicornis*, which reaches the north-western part of the Indian region) is one of the largest of the insects inhabiting European countries. This beetle has been the subject of valuable anatomical researches, some of which have been already referred to.

An interesting fact observed in different genera of DYNASTINÆ, and in different parts of the world, is the considerable growth which takes place in the egg between the times of deposition and hatching. Like those of other Lamellicornia, the eggs are spherical, whitish and moderately smooth.

The larvæ, as far as they are known, do not differ in any marked degree from those of the CETONIINÆ and allied subfamilies. They are rather stout-bodied, clothed with stiff erect hairs, the head not very large, without eyes, the mandibles strong, the maxillæ single-lobed, and the legs well and equally developed, but not long. Like the CETONIINÆ also, they feed during this stage upon decaying vegetable matter, and sometimes upon living roots or woody tissues. The food of the adult beetles is uncertain, but it probably consists chiefly of sweet or resinous vegetable exudations.

An account recently published of the habits of a species found in the Southern States of North America is interesting as showing that in this group, as in the GEOTRUPINÆ, COPRINÆ and other

Lamellicorn subfamilies, the male and female sometimes collaborate in the construction and provisioning of a nest for their young. In the 'Entomological News,' 1908, p. 286, Mr. A. H. Manee describes his observations in North Carolina of *Strategus antæus*, one of the species in which the male bears strong horns upon the thorax, surrounding a deep cavity. The beetles were found working in pairs in the neighbourhood of fallen oak-leaves accumulated in hollows by the wind. A shaft an inch in diameter was first excavated by them vertically in the ground to a depth of six or eight inches, the dug out earth forming a mound at the top. From the foot of the shaft a horizontal chamber of rather larger diameter is driven from one to five inches and this is packed with dead leaves reduced to a fragmentary state, and a single egg is placed in the middle of the mass. Sometimes two, and rarely three, such horizontal galleries were found, each containing a single egg. The egg is white and at first three thirty-seconds of an inch in length and oblong, but in three or four days it has swollen to a globular shape and is an eighth of an inch in diameter. Mr. Manee believes that, having devoured the leaves stored up by the parent-beetles, the grubs feed upon oak-roots.

Various DYNASTINÆ are injurious to pasture-land by feeding upon the roots of grasses, and several species of the *Heteronychus*-group have been found to destroy the roots of the sugar-cane. The common Indian *Phyllognathus dionysius* has been found by Mr. H. Maxwell Lefroy to feed upon the roots of rice. The development is exceedingly rapid, the larval stage lasting only three months, a short duration which has probably been brought about as an adaptation to the short life of the rice crop and the alternating periods of fertility and aridity of the hot plains in which it is cultivated.

Oryctes rhinoceros is a serious pest in cocoanut plantations, destroying the fibrous tissues at the base of the leaves and admitting the rain and starting decay in the growing tops of the palms. This species has been carefully studied by Mr. C. S. Banks and described in the Philippine Journal of Science for 1906. It is not dependent upon living food, however, being also found in vegetable débris, and even flourishing in ordinary soil containing only an average proportion of organic matter. *Oryctes nasicornis* is constantly found in the refuse-heaps of tanneries, where the larvæ feed upon the decomposed bark. It also occurs in Southern Europe in garden rubbish.

Table of the Genera.

1 (8) Basal joint of the hind tarsus similar to those succeeding.
2 (7) Legs of the male elongate.
3 (4) Elytra coriaceous in both sexes: male bearing a single thoracic horn .... XYLOTRUPES, [p. 262.

4 (3) Elytra of ♂ very shining, of ♀ rugose
male bearing paired thoracic horns. [p. 265.
5 (6) Surface metallic .... CHALCOSOMA,
6 (5) Surface not metallic .... EUPATORUS, p. 268.
7 (2) Legs of the ♂ not elongate .... PACHYORYCTES,
8 (1) Basal joint of the hind tarsus more or less [p. 272.
triangular.
9 (18) Prosternum not forming a free erect process behind the front coxæ.
10 (15) Clypeus truncate or bi-angulate.
11 (12) Propygidium bearing stridulatory ridges . ORYCTES, p. 273.
12 (11) Propygidium not bearing stridulatory ridges.
13 (14) Mandibles not dilated externally at the [p. 281.
base .... TRICHOGOMPHUS,
14 (13) Mandibles dilated externally at the base. DICHODONTUS,
15 (10) Clypeus acuminate. [p. 284.
16 (17) Body short and convex; front tibia 4-
dentate............................ BLABEPHORUS,
17 (16) Body long, not very convex; front tibia [p. 286.
3-dentate .... EOPHILEURUS,
18 (9) Prosternum forming a free erect process [p. 287.
behind the front coxæ.
19 (30) Hind tibia not contracted.
20 (21) Hind tibia digitate at the extremity .... CLYSTER, p. 293.
21 (20) Hind tibia truncate at the extremity.
22 (29) Mandibles deeply notched externally: sexes similar.
23 (26) Propygidium bearing two longitudinal
stridulatory files. [p. 294.
24 (25) Pronotum not visibly punctured .... HETERONYCHUS,
25 (24) Pronotum strongly punctured .... ALISSONOTUM,
26 (23) Propygidium without stridulatory files. [p. 298.
27 (28) Front tibia irregularly toothed .... PENTODON, p. 302.
28 (27) Front tibia regularly toothed .... MICRORYCTES,
29 (22) Mandibles not notched externally: sexes [p. 304.
dissimilar .... PHYLLOGNATHUS,
30 (19) Hind tibia contracted, strongly dilated [p. 306.
from base to extremity.
31 (32) Propygidium bearing two longitudinal
stridulatory files .... PODALGUS, p. 309.
32 (31) Propygidium produced and broadly striated DIPELICUS, p. 310.

The genus *Stypotrupes* is omitted here, although one of its species, *S. telamon*, Burm., is said by its author to inhabit "Hinterindien." This expression probably covered an area much greater than the part of the Indo-Chinese Peninsula with which this work is concerned, and *S. telamon* is represented only by a fragment which I have not seen. A second specimen, mentioned by Burmeister as in the Paris Museum, seems to have since disappeared.

Genus XYLOTRUPES.

Xylotrupes, *Hope, Coleopterist's Manual*, i. 1837, p. 19: *Burm., Handb. Entom.* v, 1847, p. 264; *Lacord., Gen. Coléopt.*, iii, 1856, p. 446.

Type, *Scarabæus gideon*, L.

Range. Asia, Polynesia and Northern Australia.

Ovate and moderately convex in shape, with rather slender legs. Clypeus bidentate. Mandibles bluntly bifid at the end and not lobed or notched externally. Maxillæ slender, thickly clothed with silky hairs and armed internally with five acute teeth; palpi slender. Labium broad, subcircular, with the anterior part very narrow and not dilated; palpi short. Prothorax acute at front angles, obtuse at hind angles, with the base margined and scarcely lobed. Prosternum not produced behind. Propygidium without stridulating ridges. Front tibiæ strongly tridentate; middle and hind tibiæ armed externally with strong spines and digitated at the ends. Tarsi simple.

♂. Head armed with a slender horn directed forward and upward. Pronotum produced into a horn at the middle Legs longer and more slender than those of the female, the teeth of the front tibia longer and the two upper ones more transverse: front tarsus rather longer and stouter than the others. Pygidium very convex. Last abdominal segment very short and deeply emarginate.

♀. Clypeus bearing an indistinct transverse ridge, minutely bituberculate at the middle. Pronotum entirely simple. Legs rather short and stout and front tibiæ broad. Pygidium flat. Abdomen slightly convex beneath and last ventral segment rather long.

Only the typical species occurs in our region.

242. Xylotrupes gideon.

Scarabæus gideon, *L., Syst. Nat.* 12th ed., i, (2) 1767, p. 541; *Burm., Handb. Ent.* v, 1847, p. 266; *Oliv., Ent.* i, (3) 1789, p. 14, pl. 2, fig. 102.
Scarabæus phorbanta, *Oliv., Ent.* i (3), 1789, p. 17, pl. 1, fig. 6.
Scarabæus oromeron, *Drury, Ill. Nat. Hist.* 1770, p. 81, pl. 36, fig. 5; *F., Syst. Ent.* i, 1775, p. 4.
Xylotrupes mniszechi, *Thoms., Arcana Nat.* 1859, p. 18.
Xylotrupes australicus, *Thoms., Arcana Nat.* 1859, p. 18.
Xylotrupes socrates, *Schaufuss, Hor. Ent. Soc. Ross.*, 1885, p. 192.

Chestnut red or brown with the head, pronotum and legs generally darker, the sternum and hind coxæ clothed with a fine pubescence.

♂. The *pronotum* has a dull satiny gloss, except at the anterior sloping part and the front part of the horn, and is very finely and sparingly punctured. The *scutellum* is short and broad, and has a

fine irregular puncturation. The *elytra* have a very fine and close, but irregular and coriaceous, puncturation. The *pygidium* is moderately strongly and closely punctured, becoming rugose at the sides, and its ventral portion is smooth and shining. The *abdomen* is shining beneath in the middle and irregularly rugose at the sides.

The *head* is armed with a horn projecting obliquely forward and upward and nearly straight, but terminating in two diverging

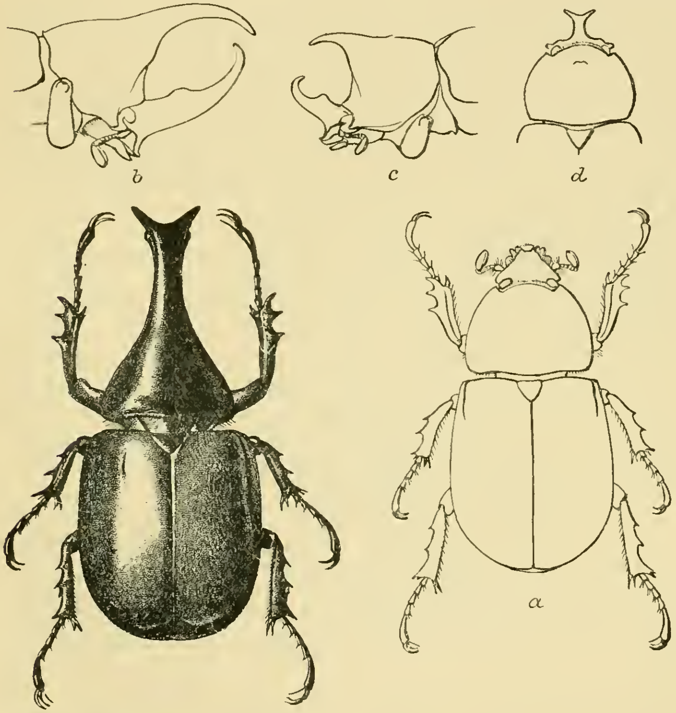

Fig. 59.—*Xylotrupes gideon*, male (natural size), with outline of female (*a*) and outlines of anterior part of males of maximum (*b*), intermediate (*c*), and minimum (*d*) development.

points which curve backwards. The basal part of the horn is laterally compressed and almost carinate above, ending in a strong compressed tooth, beyond which the horn becomes depressed. The *pronotum* is drawn out into a cone directed obliquely forward and produced at the apex into a gently curved horn bifid at the extremity, with the points directed a little downwards. The sides of the horn are carinate on the basal part of the lower surface. In fully developed specimens the thoracic horn reaches beyond

the cephalic horn and, measured from the tips to the base of the thorax, considerably exceeds the elytra in length. The inner edge of the *front tibia* is gently bisinuate and the outer edge armed with three very sharp slender teeth, of which the two uppermost are rather distant.

In males of minor development (var. *oromedon*, F.) the tooth at the upper edge of the cephalic horn disappears and the thoracic horn does not extend as far as that of the head and is very feebly bifurcated.

In the smallest specimens the cephalic horn is extremely short but distinctly bifid and the thoracic horn vanishes completely, being represented only by a slight eminence.

♀. This is generally rather darker in colour and the upper surface is much more rugose. The head is very rugose, the pronotum coarsely punctured, the punctures coalescing at the front and sides, the scutellum thinly, and the elytra closely and irregularly, punctured. The pygidium is finely rugose and the abdomen irregularly punctured beneath.

Length * 25–50 mm.; *breadth* 13–28 mm.

Bengal: Calcutta; Sikkim: Karsiang; Assam: Shillong, Sibsagar, Cachar; Bombay; Travancore; Ceylon.

Thomson's types are in M. René Oberthür's collection: the location of the older types is uncertain.

Males vary to a remarkable degree, not only in size and degree of development of the horns, but also in the texture and fine sculpture of the upper surface. Many so-called species have been based upon the different phases of this sex, but none of them appear to have at present justified themselves by sufficient evidence of constancy or even local distribution.

This is an extremely abundant insect throughout the East and is frequently attracted to houses by light. It is found in all its stages in manure heaps and accumulated vegetable débris. The larvæ are also reported to injure the roots of cane-cuttings in sugar plantations, and the adult beetles are fond of the exudation from damaged canes and are said even to make their way into them.

Although not provided with the beautiful stridulating structure found upon the upper surface of the abdomen in related genera which will be presently described, this insect is able to produce a loud hissing sound by some means which has not been investigated. It is perhaps caused by the compression and expulsion of air held between the abdomen and elytra, but careful observation should soon reveal the source of the sound. That it is used as a means of defence is shown by the following description from Lieut.-Col. Cunningham's "Plagues and Pleasures of Life in Bengal." The

* The length is always measured from the pygidium to the front of the clypeus excluding any armature.

identity of the species referred to is established by the curiously coloured but sufficiently accurate figure:—"One of the most amusing visitors is a great horned beetle who possesses a most startling power of stridulation. When one of them comes in and falls to the floor he walks quietly and sedately about so long as he is left to his own devices; but whenever he is in any way alarmed or interfered with he suddenly sits up on his hind legs and, whilst brandishing his jagged and hooked fore-paws aloft, emits a sound l ke that of a miniature engine blowing off steam. This performance is seemingly as alarming to dogs as it is to human beings who are unprepared for its occurrence. One hot still October night, when a friend and I were quietly seated at dinner, one of these beetles flew into the room and in due course fell down with a sounding flop on to the matting of the floor. A long-haired Scottish terrier, who was always on the outlook for *shikar* of any sort, was present and at once on the spot to inquire into the cause of the disturbance. The intruder at first lured her on to close investigation by minatory gesticulations and then drove her wild with terror by stridulating loudly and fastening on to the hair of her muzzle. The result was wild panic and immediate flight, in the course of which she rushed violently under the sideboard, where a number of bottles of soda-water were lying and completed her discomfiture by bursting with a series of loud reports."

Genus **CHALCOSOMA.**

Chaloosoma, *Hope, Coleopt. Manual,* 1837, i, p. 86; *Burm., Handb. Ent.* v, 1847, p. 269; *Lacord., Gen. Coléopt.* iii, 1856, p. 448.

Type, *Scarabæus atlas*, L.

Range. The Malayan Region and Lower Burma.

Form massive and very convex, with slender legs. Clypeus bidentate. Mandible stout, entire, strongly bent upwards at the extremity and rather prominent at the base externally. Maxilla long, acute at the end, not toothed, densely hairy: the palpi slender. Mentum very long and narrow, scarcely dilated or emarginate in front. Prothorax rather narrow, a little attenuated in front and sinuated at the base. Prosternum not freely produced behind the front coxæ. Front tibia armed externally with three sharp teeth set almost at right angles. Middle and hind tibiæ acutely digitate at the extremity. Tarsi simple and slender.

♂. Very shining above. Head armed with a slender horn, generally toothed at the posterior edge. Prothorax armed with a pair of slender horns arising from the sides of the dorsal part and directed forward. Front legs very elongate, the tibiæ having a row of short teeth beneath, the femora armed with a slight tooth in front. All the tarsi longer than in the female.

♀. Not shining above; more ovate, less convex, with the head and thorax entirely unarmed and the legs shorter.

One very variable species is our only known representative.

243. **Chalcosoma atlas.** (Plate II, fig. 12 (male).)

Scarabæus atlas, *Linn., Syst. Nat.* i, 1858, p. 345, *Mus. Lud. Ulr. Reg.* 1764, p. 6; *Burm., Handb. Ent.* v, 1847, p. 270; *Blanch., Voy. Pôle Sud, Zool.* iv, 1853, p. 106, pl. 9, f. 1.
Scarabæus chiron, *Oliv., Entom.* i (3), 1789, p. 18, pl. 25, fig. 217; *Guérin, Voyage de Bélanger aux Indes Orient.* 1834, p. 483, pl. 1, fig. 1.
Geotrupes caucasus, *F., Syst. Eleut.* i, 1801, p. 10.
Dynastes kirbyi, *Hope,* Gray's Zool. Misc.* 1831, p. 23.
Dynastes hesperus, *Erichs., Nov. Act. Leop. Car.* xvi, *Suppl.* 1834, p. 238, pl. 37, fig. 5.
Chalcosoma phidias, *Blanch., Voy. Pôle Sud, Zool.* iv, p. 107, pl. 9, figs. 2 & 3.

Black, with the elytra, and frequently the pronotum of the male, deep metallic green or coppery; the lower surface brownish.

♂. Very massive and exceedingly smooth and brilliant above, with long and slender legs. The *clypeus* is strongly bidentate and the ridges in front of the eyes are large and prominent. The *head* is armed with a slender pointed horn, curving forward and upward and more or less compressed behind. At its full development it is longer than the head and prothorax together, and rather sharply curved near the middle. The posterior edge is generally provided with a laminar projection on each side before the apex, but these may be absent or represented by a fine serration. There is sometimes also a strong tooth near the middle of the horn. The *pronotum* is strongly narrowed in front, generally produced into a sharp horn in the middle of the anterior margin, greatly elevated above and produced at the sides into a pair of slender, acute, nearly horizontal horns of very variable curvature, but in large specimens enclosing three-fourths of a circle. The pronotum is considerably narrower behind than the elytra and is sometimes strongly punctured at the sides, but the punctures may become partly or wholly obliterated. The *scutellum* is broad and irregularly punctured or smooth. The *elytra* are devoid of punctures and very glossy. The *propygidium* is closely punctured and the *pygidium* and the sides of the *metasternum* and *abdomen* are finely granulated and clothed with minute erect setæ. All the *tarsi* are elongate but especially the front ones; the front *tibia* is slender, the two uppermost external teeth rather far apart and the lower face armed with a row of short perpendicular teeth; the front *femora* have each a small anterior tooth.

In males of minor development (var. *kirbyi*) the cephalic horn is shortened in its apical part and the subapical laminæ become more prominent and divergent, forming with the apex a

tridentate head or club. The thoracic horns arise nearer together and are generally more parallel, disappearing entirely in the most dwarfed specimens.

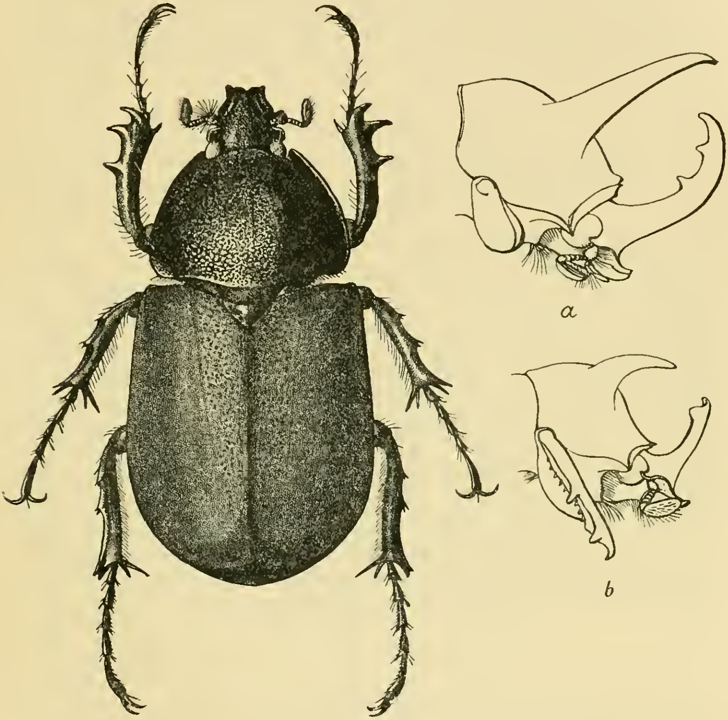

Fig. 60.—*Chalcosoma atlas*, female, natural size, and profiles of males of medium (*a*) and minor (*b*) development.

♀. The form is more ovate and less convex, and the upper surface is not at all shining. The *head* and *pronotum* are densely granulated and entirely devoid of armature, the latter very convex, with the sides regularly curved and narrowed to the front angles. The *scutellum* is shining and slightly punctured, and the *elytra* are dull, coriaceous, clothed with minute, reddish, erect setæ, which are distributed in small tufts at the middle of the back and uniformly elsewhere, and the *pygidium* and the sides of the *metasternum* and *abdomen* are clothed with similar uniformly distributed setæ. The *legs* are shorter and of normal form.

Length 45–73 mm.; *breadth* 24–44 mm.

Nepal; Burma: Martaban, Aracan; Malay Peninsula; Borneo; Java; Philippine Is.

Type in the Uppsala University Museum; that of *kirbyi* in the British Museum, that of *chiron* in the Edinburgh Museum, of *caucasus* in the Copenhagen Museum, and of *phidias* in the Paris Museum.

Although it has been so long familiar and frequently described and figured, I have been unable to find any information upon the habits of this striking beetle, which is perhaps the largest insect found in the Oriental Region.

Genus EUPATORUS.

Eupatorus, *Burm.*, *Handb. Ent.* v, 1847, p. 268; *Lacord.*, *Gen. Coléopt.* iii, 1856, p. 447.
Alcidosoma, *Casteln.*, *Revue Zool.* 1867, p. 114.

TYPE, *Dynastes hardwickei*, Hope.

Range. Tropical Asia and N. Australia.

Form very convex. Clypeus bidentate. Front angles of prothorax rather sharp; base scarcely lobed. Prosternum without a free post-coxal process. Front tibia armed with three strong sharp teeth set at right angles; middle and hind tibiæ bicarinate, finely spinose externally and slenderly digitate at the end. Tarsi simple. Mandibles long, a little dilated at the base externally and blunt at the extremity. Maxillæ densely fringed, rather broad, not tapering, and broad and internally serrate at the end; palpi not very long. Mentum elongate-oval, rather tumid beneath, with the anterior part slightly dilated: palpi very short.

♂. Head armed with a recurved horn. Prothorax bearing one or two pairs of horns. Legs longer than in the female.

♀. More ovate, less convex, entirely unarmed. Legs rather short.

Key to the Species.

1 (4) Upper surface more or less shining.
2 (3) Elytra paler at the sides: ♂ with short anterior prothoracic horns .... *hardwickei*, Hope, p. 268.
3 (2) Elytra not paler at the sides: ♂ with slender anterior prothoracic horns .. *gracilicornis*, Arrow, [p. 270.
4 (1) Upper surface entirely opaque .... *birmanicus*, Arrow, [p. 270.

244. Eupatorus hardwickei.

Dynastes hardwickei, *Hope*,* *Gray's Zool. Misc.* 1831, p. 22.
? Eupatorus atkinsoni, *Nonf.*, *Deutsche Ent. Zeitschr.* 1890, p. 89.
Var. Dynastes cantori, *Hope*, *Proc. Ent. Soc.* 1842, p. 84; *Trans. Ent. Soc.* iv, 1845, p. 76.
Eupatorus cantori, *Stebbing*, *Journ. Bomb. Nat. Hist. Soc.* xviii, 1908, pl. 4, fig. 1.
Var. Dynastes childreni, *Hope*,* *Gray's Zool. Misc.* 1831, p. 22 (♂ minor).

Black, with the lower surface and the femora dark chestnut, and the elytra bright reddish yellow, except the extreme margins

which are tinged with black. The shape is moderately elongate and very convex and the sides of the body are clothed beneath with minute tawny setæ.

Var. *cantori*, Hope. The entire upper surface is black, except a broad reddish yellow band at the outer margins of the elytra.

Var. *niger*, nov. The whole upper surface is black.

♂. The *head* bears a moderately long horn, which is strongly flattened laterally and sharply recurved. It is quite simple, rather sharp at the tip and slightly rugose at its basal part. The *pronotum* is extremely smooth and shining, with a few minute scattered punctures, which are most evident near the posterior angles. It is about as long as it is wide, with the sides approximately parallel from the posterior angles to the middle and strongly tapering from that point, the anterior angles being acutely produced. A little behind each anterior angle arises a short horizontal horn directed forward, with a slight outward curve, and rather sharply pointed. The posterior dorsal region of the thorax is humped and gives rise to a pair of similar but rather longer and nearly vertical horns curving forward at the tips. The *scutellum* is rugosely punctured and the *elytra* are smooth and shining, with very minute scattered punctures which are most apparent near the suture, where there is a line of larger impressed punctures on each side. The *pygidium* is semi-opaque, with a very few minute punctures and a finely rugose area in each lateral angle, and the apical part is inturned. The *front tibia* is rather slender, the three teeth are long and sharp, and the lower surface has a series of tubercles along the middle. All the *tarsi* are long and the claw-joint is very long.

In males of poor development the cephalic and posterior thoracic horns become reduced, and in those of very small size (var. *childreni*) the latter completely disappear. The lateral processes of the thorax are fairly constant in size.

♀. The whole surface is more rugose and opaque, the *head* and *pronotum* are coarsely rugose and the *elytra* thinly clothed with tawny setæ, the sutural edges being a little elevated and more shining. The *pygidium* and the greater part of the *lower surface* are similarly clothed. The cephalic and thoracic armature is entirely absent. The *legs* are shorter and the tarsi considerably so. The colour of the elytra is more reddish in the typical phase.

Length 42–58 mm.; *breadth* 22–33 mm.

SIKKIM: Karsiang.

Type in the British Museum; also those of *childreni* and *niger*; type of *atkinsoni* in coll. Nonfried; that of *cantori* in the Oxford Museum.

Herr Nonfried gives Kashmir as the locality of his supposed new species. A request for further particulars has met with no response and as the description contains nothing inapplicable to the present species it is best disregarded.

245. Eupatorus gracilicornis.

Eupatorus gracilicornis, *Arrow,* Trans. Ent. Soc. Lond.* 1908, p. 351.

Black, with the elytra straw-coloured except at the sutural and extreme outer margins, which are dark. The form and colouring are almost those of *E. hardwickei*, but the body is rather more elongate and the elytra are normally lighter in colour and without a paler border.

♂. The armature is similar to that of *E. hardwickei*, but all the horns are more slender, that of the head in the largest specimens reaching a length of 40 mm. The anterior thoracic horns are much longer, being fully as long as the posterior pair, strongly curved, and arising farther back than in the other species, giving the prothorax the appearance of being more produced in front.

♀. This is extremely like that of the older species, but besides the greater elongation and paler elytra, the latter are minutely pubescent only at the posterior part and the pronotum is more strongly sculptured and closely rugose at the sides.

Length 48–70 mm.; *breadth* 25–35 mm.

Assam: Jaintia Hills; Burma: Shan States; Siam: Chengmai; Tonkin: Dong-Van.

Type in the British Museum.

The curvature and direction of the horns of the male vary very much. The cephalic horn is sometimes very strongly and sometimes only slightly curved backwards, and the anterior thoracic horns generally diverge considerably, but may slightly converge. In small specimens the dorsal horns may completely disappear.

I have seen a considerable number of examples, most of them males.

246. Eupatorus birmanicus.

Eupatorus birmanicus, *Arrow,* Trans. Ent. Soc. Lond.* 1908, p. 352.

The colour is a very dark chestnut, approaching black, and the form convex and moderately elongate. The upper surface is coriaceous and scarcely shining, the scutellum and elytra quite opaque, and the pygidium and propygidium finely rugose and minutely setose. The lower surface is very scantily furnished with tawny hairs.

♂. The head is bidentate in front and bears a long slender and sharply-pointed horn, strongly curving backwards in the basal half and afterwards almost straight. The prothorax is about as long as it is broad, with the sides nearly parallel behind and strongly tapering in front, the margins produced into a sharp point on each side just behind the front angle and the dorsal part bearing a pair

of spatulate horns placed close together behind the middle. These are convex on their posterior face and concave on the anterior, they slope backwards and their tips almost meet. The legs are

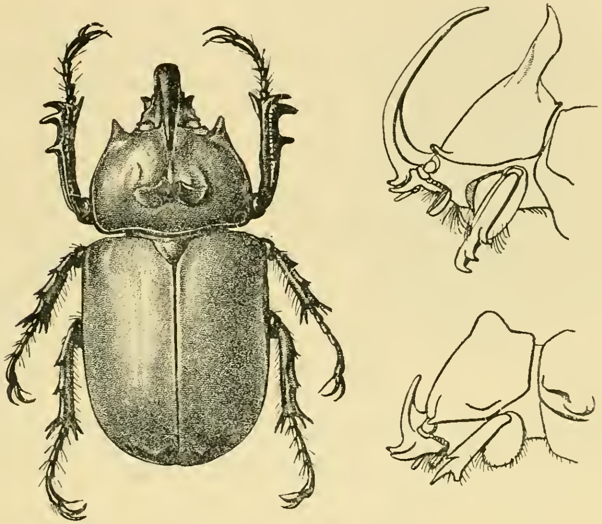

Fig. 61.—*Eupatorus birmanicus*, male.
Natural size, with part profiles showing full development (above) and minor development (below).

not long, but the front tibia is slightly elongate, and bears three nearly equal acute teeth set at right angles and a vertical tooth on the lower surface at the extremity. The front femur has an irregularly rounded laminar projection near the middle of the anterior margin.

The female is not yet known.

Length 45–48 mm.; *breadth* 25 mm.

Tenasserim: Moulmein, Mergui.

Type in the British Museum.

A ♂ specimen of low development (represented in outline above) shows the remarkable tendency to dimorphism seen in males of various genera of the group. The size is little less than that of the type specimen, but the cephalic horn is only a third of the length and bifurcated at the end and the thoracic horns are represented by a pair of nodular processes occupying the same position, but showing no indication of the very peculiar form assumed in their fuller development.

Genus PACHYORYCTES.

Pachyoryctes, *Arrow, Trans. Ent. Soc. Lond.* 1908, p. 349.

Type, *Pachyoryctes solidus*, Arrow.

Range. Burma.

Form very robust. Clypeus tapering and bidentate at the end. Mandibles very prominent, blunt in front and sinuated at the lateral margins. Maxillæ stout, broad at the extremity, where they are armed with a series of about eight minute teeth; palpi moderately long, with the 1st joint slender, the 2nd and 3rd inflated and the 4th long. Mentum thick and rather broad; labial palpi with the last joint large and the preceding ones very small. Front tibia strongly and almost equally tridentate, middle and hind tibiæ strongly spinose at the extremities. Tarsi moderately long and slender, with the first similar to the succeeding joints. Prosternal process broad, not long. Propygidium without stridulating surface.

♂. Head armed with a long, transversely flattened, strongly curved horn. Prothorax strongly retuse in front. Legs similar to those of ♀.

♀. Head armed with a blunt tubercle. Prothorax strongly punctured.

The type species is the only one so far discovered.

247. Pachyoryctes solidus.

Pachyoryctes solidus, *Arrow,* Trans. Ent. Soc. Lond.* 1908, p. 349.

Chestnut-black, rather smooth but not very shining, with minute scattered punctures above and scanty reddish hairs upon the sternum, sides of the abdomen and legs.

♂. The body is very robust and convex. The *head* is triangular and sparingly punctured and carries a long strongly recurved horn, the posterior face of which is flattened and slightly excavated. The *pronotum* is minutely and sparsely punctured, strongly curved at the sides, with the front angles prominent and acute. The *prothorax*, except at the posterior and lateral borders, is retuse, nearly flat, and very shining, with some large punctures before and behind the posterior margin of the flattened part. This margin is slightly interrupted and depressed in the middle, and elevated at each side into a more or less sharp tooth. The *scutellum* is rugose, short and very bluntly angulated. The *elytra* have a minute scattered puncturation and a single line of larger punctures upon each side of the suture. The apical margins are more thickly, and the pygidium and propygidium are strongly and closely, punctured.

♀. A little narrower and less convex. The head is very coarsely and rugosely punctured and armed with a slight tubercle. The

prothorax is coarsely punctured, the punctures being distinct behind and confluent and rugose in front, and the front angles are less

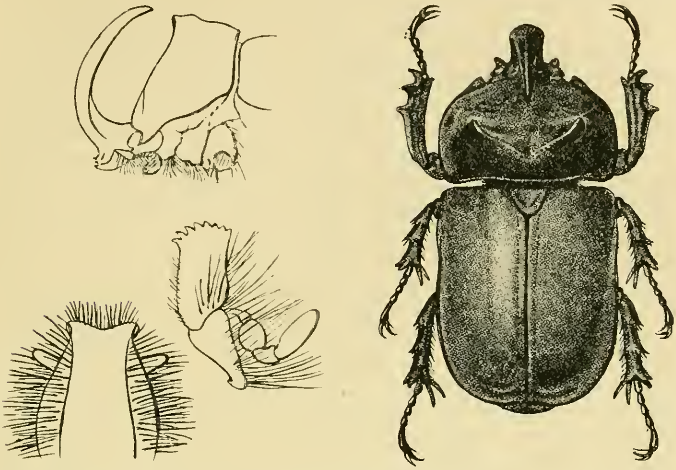

Fig. 62.—*Pachyoryctes solidus*, male, natural size, with lateral view of head and thorax (above) and enlarged details of labium and maxilla (below).

prominent than in the male. The scutellum is rather more pointed and the elytra a little longer.

Length 40–48 mm.; *breadth* 23–26 mm.

Burma: Karen Hills, 2700–3300 ft. (*L. Fea*).

Type in the Genoa Museum; cotype in the British Museum.

The male has the appearance of a stout and broad *Oryctes*, while the female greatly resembles that of a *Trichogomphus*, but the structure of the hind tarsi, the maxillæ, the horn of the male, etc., show it to have a truer relationship with the *Chalcosoma* group, although the absence of any elongation of the legs of the male forms an important distinction from *Chalcosoma*, *Eupatorus*, etc.

Genus **ORYCTES**.

Oryctes, *Illiger, Käfer Preussens*, 1798, p. 11; *Lacord., Gen. Coléopt.* iii, 1856, p. 430.

Type, *Scarabæus nasicornis*, L.

Range. Europe, Asia, Africa and Madagascar.

Form rather narrowly cylindrical, convex, smooth on the upper surface, and clothed beneath with short erect hairs. Clypeus triangular and blunt or bifid, with acute recurved angles. Head armed in both sexes with a short horn, slender and recurved in the male. Lower surface of the clypeus and organs of the mouth

densely hairy. Mandible entire, blunt at the end. Maxilla terminating in a broad lobe, not toothed; palpus long. Mentum short and tapering; palpus very short. Prothorax with the front angles acute and the hind angles rounded. Prosternal process flattened, not erect, tufted at the end. Propygidium enlarged at the expense of the pygidium, and its entire surface, except the lateral angles, covered with microscopic regular transverse stridulating ridges. Pygidium inturned beneath and very prominent behind. Legs rather short and stout, the front tibia armed with three or four strong teeth, and the middle and hind tibiæ digitated at the end; tarsi of moderate length, the basal joint in the four posterior legs distinctly triangular.

♂. The cephalic horn is generally longer than that of the female and the pygidium is smooth and convex.

♀. The pygidium is more or less conical.

This is the first genus so far dealt with in which a stridulating organ occurs. The delicate ridges occupy a considerable area, practically covering the penultimate dorsal segment, and the vibrations are produced by movements of the abdomen causing a sharp edge at the end of each elytron to be drawn across the ridges. Darwin, in the 'Descent of Man,' called attention to a difference of structure according to sex in the stridulating apparatus of *Oryctes*, resulting as he supposed in its greater effectiveness in the male. It is true, as he noticed, that the microscopic hairs scattered over the propygidium are more numerous and conspicuous in the female, but the effective part of the striated surface appears to be only a small area upon each side which is bare in both sexes, and in the sculpturing of these areas I have not been able to detect any such difference as described by Darwin. It is strange that, although two of the species here described are extremely common and well-known, I have failed to obtain any account of the sound produced by them.

Key to the Species.

1 (2)	Front tibiæ 3-dentate: hind tibiæ bluntly digitate	*nasicornis*, L., [p. 275.
2 (1)	Front tibiæ 4-dentate: hind tibiæ acutely digitate.	
3 (4)	Elytra very smooth, minutely punctured	*desertorum*, sp. n., [p. 276.
4 (3)	Elytra strongly punctured, the punctures annular.	
5 (6)	Punctures of elytra small	*nudicauda*, sp. n., [p. 277.
6 (5)	Punctures of elytra large	*rhinoceros*, L., [p. 278.

248. **Oryctes nasicornis.**

Scarabæus nasicornis, *L.*, *Syst. Nat.* i, 1758, p. 346; *Burm.*, *Handb. Ent.* v, 1847, p. 193; *Camerano, Bull. Soc. Ent. Ital.* x, 1878, p. 21.
Var. Geotrupes grypus, *Illig.*, *Mag.* ii, 1803, p. 212.
Oryctes grypus, *Duval, Gen. Col. Eur.* iii, pl. 19, fig. 95.

Dark chestnut-red, usually with the pygidium and lower surface lighter, and the head and prothorax darker, the latter frequently nearly black.

It is moderately elongate, smooth and shining above and clothed with tawny hairs beneath. The *clypeus* is tapering and blunt or broadly emarginate in front. The *scutellum* is irregularly punctured, or rugose, with a smooth outer margin; and the *elytra* are finely and irregularly punctured, with a strongly impressed row of coalescing punctures adjoining the suture and slight traces of other double series. The stridulating ridges of the *propygidium* are exceedingly fine. The front *tibia* is armed with three external teeth and without any tooth on the lower surface; the middle tibiæ are not much shorter than the hind ones, and each of the four posterior tibiæ is armed at the extremity with two not very acute teeth.

♂. There is a strongly recurved, rather compressed horn on the head, rugose at the sides and punctured in front, and the prothorax is strongly angulated at the sides, which are produced forward forming acute angles in front. The disc is broadly elevated behind, forming a three-toothed transverse carina, and cut away from the carina to the front margin. The posterior part is finely punctured, the anterior declivity smooth and scarcely punctured, and the sides, except in the posterior part, coarsely rugose. The pygidium is very convex and quite smooth and shining, except in its lateral angles, where it is very finely rugose.

♀. The head is entirely rugose and armed only with a very short conical horn directed backwards. The prothorax is rounded at the sides, the front angles are not prominent, there is a slight, transversely oval excavation reaching from the front margin to near the middle and the surface is entirely rugose, except near the hind margin, where it is punctured. The propygidium bears a microscopically fine pubescence and the stridulating ridges are slightly coarser than in the male. The pygidium is punctured and rather thinly pubescent, with a transverse carina which is angulated in the middle.

Length 26–40 mm.; *breadth* 13·5–19 mm.

BALUCHISTAN; KASHMIR (*teste* Fairmaire); S.W. ASIA; S. & S.E. EUROPE.

Var. **grypus**, Illig.—The elytra are more smooth and shining, with the punctures scarcely visible or entirely absent. Various other differences which have been pointed out are inconstant and of little importance. The two forms have long been regarded as distinct species and the variety *grypus* is described as the Eastern

representative of the Western and Central European *Oryctes nasicornis*; but, although there is a tendency for one or other of the forms to preponderate in the different regions, they also occur together, and when a large series is studied it becomes impossible to divide them sharply.

O. nasicornis is the largest and most common of the two or three insects which alone represent the essentially tropical subfamily Dynastinæ in Europe. It is found in old decayed trunks of oak, olive, chestnut and other trees, in accumulations of vegetable débris in gardens, etc., and most commonly of all in the refuse heaps of tanneries, from which, in the countries it inhabits, it is said to be rarely absent. Westwood states that the larval period lasts four or five years, but probably this is only when it is retarded by unfavourable circumstances. The beetles conceal themselves during the day and fly at dusk, appearing in Southern Europe about July. Xambeu (Le Naturaliste, 1902, p. 102) gives the following particulars:—The eggs when laid are coated with a glutinous substance which causes the surrounding earthy particles to adhere to and conceal them, an obvious protection against hungry foragers. Twelve or fifteen eggs are deposited not far apart within the tree or refuse-heap and hatch in fifteen to twenty days. The larva feeds during the autumn and winter and pupates in May. According to M. Fabre, this larva is the natural prey of the great parasitic Wasp, *Scolia hortorum*, the female of which seeks it out in its retreat and, having paralysed it by stinging it in the ventral ganglion-mass, deposits an egg beside the puncture. The *Scolia* grub rapidly devours the whole interior of its immobile victim, leaving only an empty skin beside which it forms its own cocoon.

249. **Oryctes desertorum**, sp. n.

? Oryctes sinaica, *Walker, List of Coleopt. coll. by J. K. Lord in Egypt, etc.*, 1871, p. 13.

Dark chestnut-red, with the pygidium, femora and lower surface lighter and the head and pronotum sometimes darker.

It is a small species, elongate, cylindrical, smooth and shining above, and clothed with erect tawny setæ beneath. The *clypeus* has two sharp divergent teeth in front. The *pronotum* is strongly rounded at the sides, with the hind angles obliterated. It is excavated and rugose in front and smooth behind. The *scutellum* is irregularly punctured and the *elytra* are finely and irregularly punctured, some of the punctures forming indistinct double rows. The *propygidium* is finely transversely striated. The front *tibia* is armed with three strong teeth and a blunt uppermost one, and the middle and hind tibiæ are strongly and sharply digitated at the end.

♂. The head bears a strongly curved, not very long, horn and is rugose at the sides. The pronotum has a broad, oval, rugose

excavation extending from the front to about the middle, the hind margin being very feebly produced forwards into a slight bifid process. The posterior half of the pronotum is smooth and shining, with only a few minute punctures; the front angles are depressed and rugose, and there is a narrow rugose area near the median excavation on each side. The pygidium is bare, smooth and shining in the middle, where there are only minute punctures, and coriaceous at the sides.

♀. The head is entirely rugose and armed with a very short horn. The pronotum has an anterior rugose depression which does not reach the middle, and the posterior margin of this is feebly produced forward into a blunt point. There is a small punctured area just behind this point and a large rugose depression on each side. The pygidium is pointed and clothed with rather long tawny hairs.

Length 24–35 mm.; *breadth* 12·5–17 mm.

SIND: Karachi; PERSIA; ARABIA: Muscat, Fao, Lahej.

Type in the British Museum; that of *sinaicus* destroyed.

This is probably the *Oryctes sinaicus* of Walker, presumably brought from the Sinai Peninsula, but the type of that, together with the numerous other Coleoptera described by Walker in the same paper, no longer exist, and as few of the species will ever be determined with any degree of certainty from the descriptions I consider it best to treat the names as, like the types, non-existent. The collection was housed in the School of Medicine at Cairo, but the late Director of that Institution, Dr. Innes, informs me that, through neglect, the insects had entirely disappeared more than twenty years ago, and only the labels remain.

250. **Oryctes nudicauda**, sp. n.

Deep chestnut-colour, with the lower surface reddish, clothed with tawny hairs. The form is narrowly cylindrical and the general structure that of *Oryctes rhinoceros*, L. The *clypeus* is sharply cleft, the points not strongly diverging and the horn is rugosely punctured, except at the base behind. The *pronotum* is distinctly transverse, strongly margined all round, with the front angles acute, the hind angles almost obliterated and the sides strongly bisinuated. There is a transversely oval rugose excavation extending from the front margin to the middle or beyond it and bounded by a smooth carina with a slight projection behind. There is an elongate depression outside the carina on each side, and another in each front angle. All these depressions are rugose, and the remaining surface is smooth, shining and minutely punctured. The *scutellum* is rugose, with a smooth outer margin, and the *elytra* are moderately punctured, the punctures being annular and some of them forming inconspicuous double rows; the apical margins are densely punctured. The *propygidium* is scarcely produced and the stridulatory ridges are not very fine.

The *pygidium* is smooth, rounded and very finely rugose in both sexes. The front *tibia* is armed with four teeth, the uppermost one small, and there is only a vestige of a tooth upon the lower face. The middle and hind tibiæ are very acutely digitated.

♂. The cephalic horn is longer than that of the female and the posterior margin of the thoracic cavity forms, in the middle, part of a very broad trisinuate projection. The pygidium is very convex and quite hairless.

♀. The lateral rugose areas of the pronotum unite behind the carina and the pygidium is entirely devoid of hairs, as in the male, and slightly pointed.

Length 28–33 mm.; *breadth* 14–15·5 mm.

BURMA: Minhla (*Comotto*, 1881–2).

Type in the Genoa Museum; cotype in the British Museum.

O. nudicauda resembles the much more widespread *O. rhinoceros* very closely, but the elytra are much less coarsely punctured, besides which the pygidium is without the basal fringe in the male and the thick hairy clothing found in the female of that species and is of a different shape in the latter sex.

251. Oryctes rhinoceros.

Scarabæus rhinoceros, *L.*, *Syst. Nat.* i, 1758, p. 346; *Oliv.*, *Ent.* i. (3), 1789, p. 34, pl. 18, fig. 166.
Oryctes rhinoceros, *Burm.*, *Handb. Ent.* v, 1847, p. 202.

Black or pitchy, with the lower surface reddish and clothed with a short tawny pubescence. It is elongate-cylindrical in shape. The *clypeus* is sharply forked, with the points directed forwards, and the horn rather broad at the base, tapering to a blunt point and rugosely punctured except at the base behind. The *pronotum* is almost as long as it is broad, strongly margined all round, with the front angles sharp, the hind angles obliterated, the sides strongly rounded behind and convergent in front. There is an approximately oval excavation extending from the front to beyond the middle of the disc and surrounded by a smooth carina which forms behind a short truncate process directed forwards. There is an elongate depression outside the carina on each side and another in each front angle. All the depressions are rugose and the remainder of the surface is smooth and shining but minutely punctured. The *scutellum* is rugose, with a smooth outer margin; and the *elytra* are strongly and closely punctured, the punctures being annular and forming a juxta-sutural line and three pairs of other lines rather wide apart, with closely punctured intervals: the sides and apices are more finely punctured. The *propygidium* is very large, lobate behind and rather closely ridged or striated. The front *tibia* is armed with four teeth, the uppermost one small, and there is also a sharp and conspicuous tooth on the lower face. The middle tibiæ are much shorter than the hind ones and all are very acutely digitated at the end.

The head and thorax are very similar in the two sexes, but the ♂ has generally a longer horn. The pygidium is protuberant in both sexes, but in the ♂ it is rounded, finely rugose and bare,

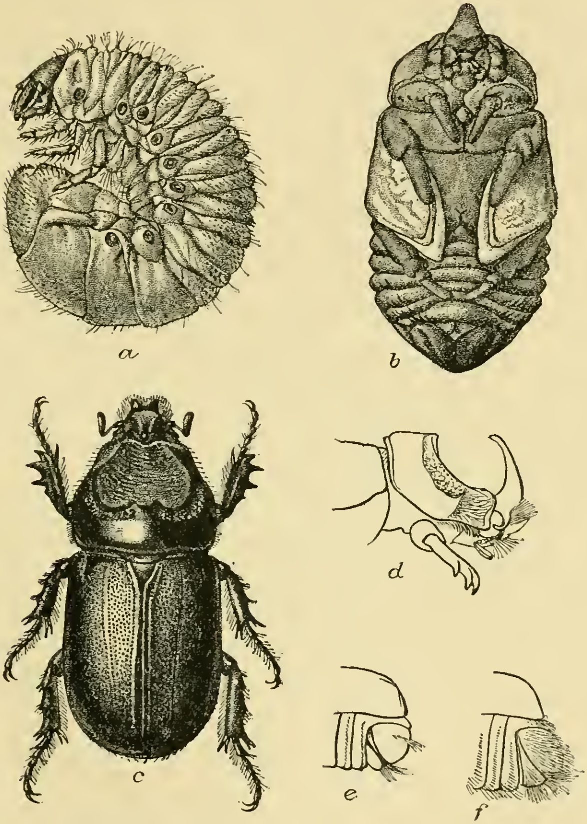

Fig. 63.—Larva (*a*), pupa (*b*), and male imago (*c*) of *Oryctes rhinoceros*, with lateral view of head and thorax (*d*), and extremity of the body of male (*e*) and female (*f*). All natural size.

except for a hairy strip at the anterior margin, while in the ♀ it is pointed and densely clothed with tawny hairs.

Length 39–47 mm.; *breadth* 18–22 mm.

Ceylon; Madras: Malabar; Bombay: Kanara, Bandra; Bengal: Howrah; Tenasserim: Maliwon; Siam; Annam; Singapore; Pahang; Sumatra: Java; Celebes; Ceram; Amboyna; Philippine Is.; Formosa; Corea; Hongkong.

Type in the Uppsala University Museum.

This is an extremely common beetle, familiar in many parts of the East as the Rhinoceros Beetle or Black Cocoanut Beetle, and is one of the two great enemies of the Cocoanut Palm, the other being the Palm Weevil or Red Cocoanut Beetle (*Rhynchophorus*). The latter begin their attack at the roots and tunnel upwards into the tree, but the Rhinoceros Beetle on the contrary always begins at the top, the soft growing point of the tree, and works gradually downwards, assisted by the decay caused by the entrance of water at the opening made. Its depredations have been described by Mr. L. C. Brown in the Agricultural Bulletin of the Straits and Federated Malay States, 1903, p. 66, and more exactly by Mr. Chas. S. Banks in the Philippine Journal of Science, vol. i. 1906, p. 143. The latter states that the beetles' attacks are confined to the soft tissues near the top of the tree, and holes seen in the trunk below this point date from the time when the growing apex was here located. "The attacks always begin during the night and by the following morning it will frequently have entered so far into the burrow as to be protected from the light. It then continues its feeding until a gallery of considerable size has been excavated. . . . . Observation has shown that the males make burrows as well as the females and it is probable that they always accompany the latter at the time of egg-laying, retreating from the burrow they have made to allow the female access. . . . . It is rare to find a single Cocoanut tree anywhere in the Philippines which does not show one or more evidences of attack by this beetle. It is the pest most frequently reported by farmers and cocoanut growers, and in hundreds of trees which I have personally examined large holes in the trunk, distorted leaf-stems, or ragged leaves demonstrate the character of its work. The insect larva or the adult, in its work inside the tree, frequently cuts off the tip of the embryo leaf or the tips of the leaflets on one or both sides of the midrib, so that when the leaf finally grows it appears as if it had been trimmed with a pair of shears or as if a triangle had been cut from one or both sides. The fibres severed by the insect protrude from its burrow, giving the latter a ragged appearance. During the daytime the beetles are frequently encountered in very old holes, into which they evidently have gone for the purpose of hiding." Mr. Banks has figured a standing tree in which nearly the whole interior from the top to within half a yard of the ground has been hollowed out and from which nearly a hundred larvæ were taken.

This unfortunate taste for the cocoanut tree is probably an acquired one, for the larvæ are also found in a variety of other situations and appear to have a remarkable power of adapting themselves to circumstances. They will flourish in rotten wood, decaying leaves, sawdust, manure heaps, etc., and in one case 70,000 grubs are said to have been taken upon one estate from the ground itself, the soil being a very rich vegetable mould. The ground was flooded in order to destroy them (Agric. Bull. Straits

& Fed. Malay States, 1904, p. 18). It is probable that their primitive habit is to feed in decaying vegetable refuse, like their kin in general and that at first the eggs were only deposited in standing trees when decay had begun, the adult beetles perhaps resorting to the palm "cabbage" for the sake of its juices. They are attracted by the oozing sap when leaves have been cut off and the removal of old leaves with their tough basal sheaths makes the trees more vulnerable at that point. The best methods of coping with the beetle are fully dealt with by Mr. Banks in the treatise quoted above.

Genus **TRICHOGOMPHUS**.

Trichogomphus, *Burm., Handb. Ent.* v, 1847, p. 219; *Lacord., Gen. Coléopt.* iii, 1856, p. 432.

Type, *Geotrupes milo*, F. (Philippine Is.).

Range. The Oriental Region.

Form moderately elongate and not very convex. Legs not long, very spinose; front tibia armed with three teeth, posterior tibiæ digitated at the end. Tarsi rather short, the basal joint in the hind feet rather triangular. Clypeus tapering, bidentate at the apex. Mandibles acute in front, strongly curved, entire at the outer edge. Maxillæ short, broad, rounded at the end and without teeth, but with a short dense fringe of fulvous hairs. Mentum long, with a narrow ligular part. There is no free prosternal process. The propygidium is without stridulating ridges, and the pygidium is smooth and flat in both sexes and not inturned ventrally.

♂. The head is armed with a simple laterally-compressed horn. The prothorax is cut away in front and elevated behind into a short massive protuberance. The legs are similar in both sexes.

Key to the Species.

1 (2) The greater part of the elytra strongly punctured	*martabani*, Guér., p. 282.
2 (1) The greater part of the elytra smooth and free from punctures.	
3 (4) Sides of the elytra irregularly or not at all punctured	*mongol*, Arrow, p. 283.
4 (3) Sides of the elytra having two or three rows of punctures	*acuticollis*, Arrow, p. 284.

Trichogomphus lunicollis, Burm., and *bronchus*, Jabl., are Malayan species which have been inaccurately catalogued as Indian.

252. Trichogomphus martabani.

Scarabæus martabani, *Guér.*, *Voy. Bélang. Ind. Or.*, *Zool.*, 1834, p. 484, pl. 1, fig. 3; *Arrow, Trans. Ent. Soc. Lond.*, 1908, p. 347.
Trichogomphus tonkinens, *Fairm., Ann. Soc. Ent. Belg.*, 1898, p. 313.

Shining black, with the lower surface and femora slightly reddish, and scantily clothed with tawny hairs at the sides beneath.

The form is elongate and parallel-sided. The *head* is rugose, the *pronotum* rugose in front and at the posterior angles, which are well-marked, and smooth and shining elsewhere. The *scutellum* is rugose and setose in front and smooth behind. Each *elytron* has a strongly impressed line of coarse annular punctures adjoining the suture and two or three pairs of similarly but less closely punctured lines upon the disc; with irregularly punctured intervals, and the outer margins are minutely and rather scantily punctured. The *pygidium* is nearly smooth in the middle but strongly punctured towards the circumference and setose at the base and in the lateral angles. The *metasternum* is coarsely and scantily punctured, but almost smooth in the hinder part, and the *abdomen* is very sparingly punctured.

♂. The head is armed with a strong, simple, laterally-compressed horn, moderately long and a little recurved. The prothorax is subquadrate, the sides being more parallel than in the female, and rather abruptly bent round in front, with the posterior angles sharper. There is a distinct lobe at the middle of the base and in well-developed examples this is very large and almost covers the scutellum. The front part of the pronotum is broadly excavated; the excavation is rugose except in the middle, its sides are produced upwards into a tooth on each side, and the hinder part is smooth and elevated in the middle into a hump, which is produced slightly forward over the excavation and ends in two blunt tubercles.

In small males the curvature of the sides of the prothorax is more gradual, the posterior angles are more obtuse, the hump is absent, and only a slight anterior depression, bordered by two lateral and two posterior minute tubercles, remains.

♀. The head is armed with a minute acute tubercle. The prothorax has the sides curvilinear, the front angles acute and the hind angles obtuse; the disc is moderately convex, irregularly rugose in front and in the hind angles, and almost smooth behind, and the base is trisinuate. The sides of the elytra are more curvilinear than in the male.

Length 35–56 mm.; *breadth* 17–27 mm.

ASSAM: Manipur, Silhet; BURMA: Martaban, Karen Hills, Kachin Hills, Metanja (*L. Fea*).

253. Trichogomphus mongol.

Trichogomphus mongol, *Arrow,* Trans. Ent. Soc. Lond.*, 1908, p. 347.
Trichogomphus martabani, *Burm.* (nec *Guér.*), *Handb. Ent.*, v, 1847, p. 220.

Shining black, with the lower surface and femora reddish, and scantily clothed with tawny hairs at the sides beneath. The form is that of *T. martabani*, with which it may be easily confused, but the elytra are almost smooth and impunctate, having only a deeply impressed sutural line upon each and a few large irregular

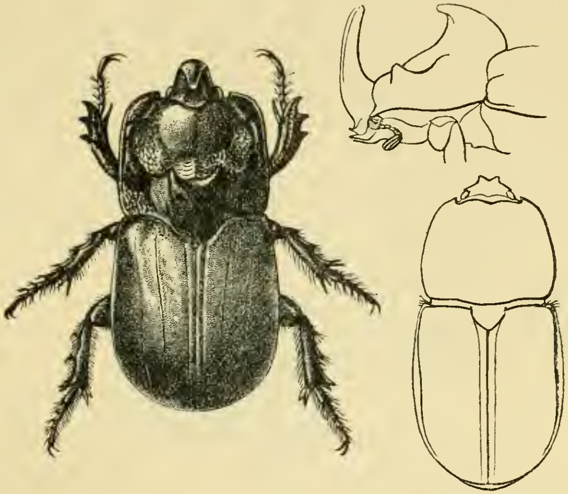

Fig. 64.—*Trichogomphus mongol*, male, natural size, with lateral view of head and thorax (above) and outline of female (below).

punctures close to the base. There are usually a few longitudinal impressions or vestigial striæ, but these are entirely free from punctures. The apical margins are slightly rugosely punctured.

♂. The armature of the head and thorax is the same as that of *T. martabani*, but in well-developed specimens the posterior thoracic horn is more hollowed out in front and its lateral edges are more sharply carinate. The hind angles of the prothorax are more obtuse than in that species.

Length 33–47 mm.; *breadth* 18–25 mm.

Burma: Kachin Hills (*L. Fea*); Siam; Cambodia; China: Hong Kong.

Type in the British Museum.

Whereas *T. martabani* ranges north-westwards from Burma, *T. mongol* extends eastwards from that centre and is apparently not found in India proper.

254. Trichogomphus acuticollis.

Trichogomphus acuticollis, *Arrow*,* *Trans. Ent. Soc. Lond.*, 1908, p. 348.

Size and general appearance of the preceding species, but the *elytra* are each decorated with a strongly impressed sutural stria, two or three lines of punctures at the lateral margin, some irregular punctures at the base and a closely and irregularly punctured area at the apex. The *scutellum* is very scantily punctured.

♂. The head is armed with a moderately long, slightly recurved, laterally compressed horn. The sides of the prothorax are obliquely produced in front and the anterior angles directed forward. The sides are more regularly curved behind than in *T. martabani* and *T. mongol* and the widest part of the thorax is at, or a little before, the middle, instead of behind it. The base is very strongly lobed behind and elevated into a hump, which is not broadly forked in front but bluntly pointed, the point showing only a trace of bifurcation.

In a male specimen of minor development the armature is reduced to a condition almost indistinguishable from that of similarly undeveloped examples of *T. mongol.*

The female is unknown.

Length 38–45 mm.; *breadth* 20–24 mm.

TENASSERIM: Dawna Range, 1500 ft.

Type in the British Museum.

Genus DICHODONTUS.

Dichodontus, *Burmeister, Handb. Ent.* v, 1847, p. 217; *Lacord., Gen. Coléopt.* iii, 1856, p. 436.

TYPE, *Dichodontus coronatus*, Burm.

Range. Burma, Siam and the Malayan Region.

Generally smaller than *Trichogomphus*, compact and very convex. Clypeus tapering, truncate at the apex. Mandibles bluntly bidentate at the extremity and furnished with a very prominent and exposed rounded lobe at the outer edge. Maxilla armed with three strong terminal teeth and thickly tufted with hairs. Mentum short and tapering. Prothorax generally very wide in the middle, the prosternal process flattened, not erect. Propygidium without stridulating ridges. Legs not long; front tibia armed with three teeth; hind tibia truncate; basal joint of the hind tarsus slightly triangular.

♂. Head (and sometimes also that of the ♀) armed with a slender horn curving backward. Pronotum (sometimes that of the ♀ also) broadly elevated in the middle of the posterior part. Pygidium convex, shining and nearly smooth. Last ventral segment smooth and emarginate.

♀. Pygidium rugose, not very convex. Last ventral segment rugose, triangular.

The species are few and only one is known to occur in India.

255. Dichodontus coronatus.

Dichodontus coronatus, *Burm., loc. cit.*, p. 218.

Black or piceous, reddish beneath; rather short and broad, very smooth and shining above and rather densely clothed with tawny hairs beneath. The *clypeus* is rugose, very narrow, emarginate at the extremity, with the angles acute. The *head* is armed with a moderately sharp and slender horn. The *prothorax* is trisinuate at the base, the hind angles are sharp but slightly obtuse, the sides gently rounded and very slightly diverging from the base to the middle, where they are very prominent, and from there abruptly narrowed and concave, with the front angles very

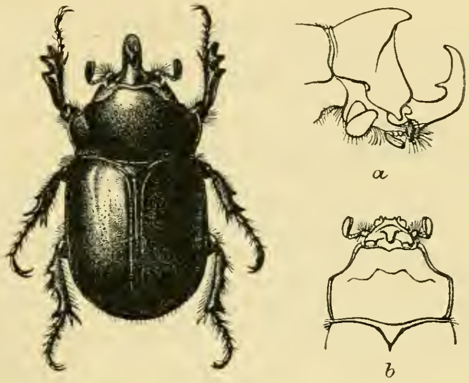

Fig. 65.—*Dichodontus coronatus*, male, natural size, with outlines of anterior part of male (*a*) and female (*b*).

acute. The anterior half of the *pronotum* is depressed and the posterior half elevated into a broad hump, the anterior edge of which is sharp and usually forms four angles, the two inner ones a little in advance of the others. The *scutellum* is rather short, rugose and hairy. The *elytra* are rather feebly punctured, most of the punctures falling into longitudinal rows, and there is a deeply impressed stria on each side of the suture.

♂. The cephalic horn is strongly curved, laterally compressed, and in well-developed specimens bears a strong blunt tooth at the middle of the posterior edge. The pronotum is strongly elevated behind and that portion is entirely smooth, except near the sides and base, where it is rugosely punctured. The anterior half is entirely smooth in the middle but slightly rugose in the front

angles and immediately under the extremities of the carina. The upper part of the pygidium is a little punctured and hairy and the apical part smooth, and the abdomen is almost smooth beneath.

♀. The cephalic horn is simple, less strongly curved, and generally shorter. The pronotum is similarly shaped to that of the male, but rather less elevated behind and coarsely punctured at the summit from side to side. The anterior part is rugose, with a smooth area in the middle and one on each side. The pygidium is finely rugose and densely clothed with erect tawny hairs, the last ventral segment is less closely rugose and hairy, and the remainder of the abdomen beneath is very feebly punctured.

Length 22–33 mm.; *breadth* 13–19 mm.

TENASSERIM: Mergui; SIAM; MALAY PENINSULA; BORNEO.

This insect is said by Burmeister to inhabit the Malabar Coast, but this is no doubt a mistake.

Genus **BLABEPHORUS.**

Blabephorus, *Fairm., Ann. Soc. Ent. France,* 1898, p. 382; *Arrow, Trans. Ent. Soc. Lond.* 1908, p. 346.

TYPE, *Blabephorus pinguis*, Fairm.

Range. India, Burma and the Malayan Region.

Form short and stout, with legs of moderate length, the front tibia armed with four acute teeth, the middle and hind tibiæ dilated and very sharply digitated at the extremity. The tarsi are slender and the basal joint in the posterior feet strongly spinose. Clypeus tapering, blunt and a little reflexed at the apex. Mandible largely exposed externally, sinuated at the outer edge and bluntly pointed at the end. Maxilla furnished with three very acute teeth; palpus rather long. Mentum very protuberant beneath, bilobed in front. Prosternal process not free but rather swollen in front. Propygidium without stridulatory ridges.

♂. Head armed with a short, strongly curved horn. Pronotum broadly excavated at the middle.

♀. Head armed with a short conical tubercle. Pronotum with a broad well-marked longitudinal furrow.

Only a single species of this peculiar genus is known.

256. **Blabephorus pinguis.**

Blabephorus pinguis, *Fairm., loc. cit.* p. 383; ♂, *Arrow, loc. cit.*

Chestnut-red, with short tawny hairs beneath; short, oval, and very convex in form. The *head* is finely rugose and the *clypeus* blunt and reflexed. The *prothorax* is short, approximately semicircular, with the sides strongly rounded in front and rather contracted behind, the posterior angles very blunt and the base feebly trisinuate. The upper surface is rugose in front and in the excavated part and punctured elsewhere. The *scutellum* is strongly

punctured, and the *elytra* are coarsely coriaceous, with a punctured stria adjoining the suture and other coarse irregular punctures distinguishable in the same region. The *propygidium* is thinly setose and the *pygidium* bare and rugosely punctured.

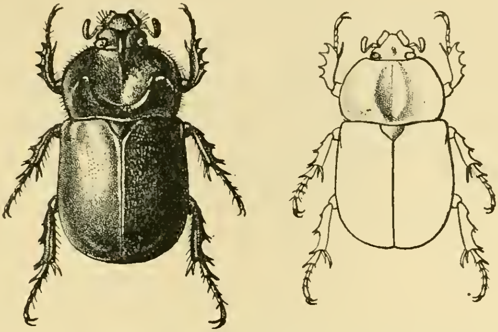

Fig. 66.—*Blabephorus pinguis*, male, natural size, and outline of female.

♂. The body is rather shorter than that of the female. The horn on the head is short but slender, compressed and strongly recurved. The prothorax is very strongly rounded at the sides, with the front angles obliterated and the hind angles more obtuse than in the female. The thoracic cavity is rounded and extends from the front almost to the hind margin in well-developed specimens, the lateral margins of the cavity are sharp and each is produced to a point in the middle. The pygidium is convex and strongly punctured.

♀. There is a conical tubercle on the head and a broad longitudinal furrow extending from the front to the hind margin of the pronotum, its sides rounded. The pygidium is impressed on each side and very smooth in the middle.

Length 28–34 mm.; *breadth* 16–18 mm.

Assam: Cachar, Sibsagar; Burma: Karen-ni (*L. Fea*); Tenasserim: Dawna Hills, 2000–3000 ft., March.

Type in the Paris Museum.

Genus EOPHILEURUS.

Eophileurus, *Arrow, Trans. Ent. Soc. Lond.* 1908, p. 332.

Type, *Geotrupes planatus*, Wied.

Range. Tropical Asia.

Rather long and narrow, parallel-sided and depressed. Head armed with a single short median horn or tubercle, the clypeus

triangular, pointed and slightly reflexed at the apex. Mandible acutely produced in front and sinuous at the outer edge. Maxilla armed with three teeth. Labium long, scarcely tapering, broadly bilobed in front, with the palpi inserted on the inside. Prosternal process long and erect, resting against the front coxæ. Propygidium without stridulatory ridges. Pygidium protuberant. Legs moderately long; front tibia armed with three very acute teeth, without secondary denticles; hind tibia truncate and fringed with short stiff spines. Tarsi slender, with the basal joint of the middle and hind pair triangular.

♂. Head armed with a short horn and smooth and shining behind it. Front tarsi thickened and the inner claw flattened and cleft. Pronotum more or less impressed in the middle.

♀. Head rugose or closely punctured with a small median tubercle. Pronotum generally unimpressed.

Key to the Species.

1 (10)	Sides of the metasternum more or less shining.	
2 (3)	Punctures of the upper surface not very coarse	*planatus*, Wied., p. 288.
3 (2)	Punctures of the upper surface very coarse.	
4 (7)	Scutellum not strongly punctured.	
5 (6)	Scutellum with a few punctures..	*platypterus*, Wied., p. 289.
6 (5)	Scutellum unpunctured	*perforatus*, Arrow, p. 289.
7 (4)	Scutellum strongly punctured.	
8 (9)	Elytra bearing large annular punctures in rows	*cingalensis*, Arrow, p. 290.
9 (8)	Elytra bearing large annular punctures not in rows	*decatenatus*, sp. n., p. 291.
10 (1)	Sides of the metasternum entirely rugose.	
11 (12)	Metasternum very thinly hairy ..	*nilgirensis*, Arrow, p. 291.
12 (11)	Metasternum thickly hairy	*chinensis*, Fald., p. 292.

257. **Eophileurus planatus.**

Geotrupes planatus, *Wied.*,* *Zool. Mag.*, ii, 1, 1823, p. 5.

Black, moderately shining and closely punctured. The *prothorax* is strongly curved at the sides, not very broad at the base, and the hind angles are very obtuse; it is closely, not coarsely, punctured all over, the punctures being confluent in front and fine and less close in the middle behind. The *scutellum* bears a few isolated punctures, and the *elytra* are closely covered with annular but not coarse punctures, confluent at the sides and apices, and arranged in irregular rows on the disc, with the interstices minutely punctulated. The *metasternum* is finely punctured in the middle and strongly punctured and pubescent at the sides, and the *abdomen* has scattered punctures.

♂. The cephalic horn is short and simple. The pronotum has an anterior depression not reaching the middle. The pygidium is very convex and shining, strongly but not closely punctured.

♀. There is a faint trace of a longitudinal furrow upon the pronotum and the pygidium is rugosely punctured, a little flattened near the base, with a slight prominence just before the apex.

Length 22–25 mm.; *breadth* 9·5–11 mm.

UNITED PROVINCES: Almora; BENGAL: Dacca; SIKKIM; ASSAM: Silhet, Naga Hills, Patkai Hills, Manipur; TENASSERIM; ANDAMAN and NICOBAR Is.

Type in the Copenhagen University Museum.

258. Eophileurus platypterus.

Geotrupes platypterus, *Wied.*,* *Zool. Mag.* ii. 1, 1823, p. 5.

Black and shining, closely and very coarsely punctured, with very scanty bristles beneath. The *pronotum* is strongly rounded at the sides, with the hind angles rather prominent and sharp and the entire surface very deeply and coarsely punctured, the punctures becoming confluent in the anterior part. The *scutellum* bears a few fine punctures, and the *elytra* have rows of rather close large annular punctures, a little finer at the sides and confluent and rugose in the posterior part. The *pygidium* is moderately finely punctured and has a finely rugose band at the base, the *metasternum* is coarsely and sparsely punctured (rather more finely in the middle), and the *abdomen* is finely and irregularly punctured.

♂. The head is moderately punctured and there is a very short horn, which is slightly compressed from side to side and a little produced backwards at the base. The prothorax has a feeble impression at the front margin and the pygidium is very convex.

♀. The head is rugosely punctured and bears a short stout tubercle. The pygidium is a little impressed on each side and almost pointed behind.

Length 14–18 mm.; *breadth* 7–9 mm.

BOMBAY; MADRAS: Malabar, Moghal Serai.

Type in the Copenhagen University Museum.

259. Eophileurus perforatus.

Eophileurus perforatus, *Arrow*,* *Trans. Ent. Soc. Lond.* 1908, p. 332.

The species is black, shining and coarsely punctured, the punctures not very numerous on the *prothorax*, which has a slight longitudinal sulcus at its posterior part, and absent from the *scutellum*. The sides of the prothorax are strongly rounded and the hind angles not very sharp. The punctures are deep,

irregular and scanty, upon the disc, closer and finer at the front and sides. The *elytra* bear rows of annulate, moderately distant punctures and extremely minute punctulations in the interstices. The *pygidium* is coarsely punctured and the *metasternum* bears large deep crescentic impressions at the sides and rather fine punctures in the middle, and there are also fine and scanty hairs.

♂. The head is smooth and shining, with a simple slender horn, and the prothorax has a shallow broad impression behind the front margin.

♀. The head is rugosely punctured and bears a tubercle.

Length 19–22 mm.; *breadth* 9–10 mm.

CENTRAL INDIA: Mhow; BOMBAY: Belgaum.

Type in the British Museum.

A specimen was found by Mr. H. E. Andrewes in the hollow stem of a decayed Mango tree.

E. perforatus resembles *E. platypterus*, Wied., but is rather larger and much less densely punctured, especially upon the prothorax, which is sparingly, though very coarsely, punctured and bears a longitudinal impression absent in the other species. The scutellum is without the large punctures present in *E. platypterus*. The male is most markedly distinguished by the head, which is smooth with a slender horn, while in the older species it is closely punctured and the horn is laterally compressed.

260. Eophileurus cingalensis.

Eophileurus cingalensis, *Arrow,* Trans. Ent. Soc. Lond.* 1908, p. 333.

Black, shining, rather broad and depressed, very coarsely punctured above and very scantily clothed with stiff tawny hairs beneath. The *prothorax* is strongly rounded at the sides and very strongly punctured all over, the punctures becoming confluent in front. The *scutellum* is confusedly punctured, and the *elytra* are closely covered with rows of very large ring-shaped impressions, the interstices being minutely and scantily punctulated. The *pygidium* is coarsely and rather rugosely punctured and the *metasternum* decorated with large crescentic impressions, except at the middle, which is almost smooth; it bears only a few tawny hairs.

♂. There is a short simple horn on the head, which is quite smooth and shining behind it. The pronotum bears a faint median groove, which is rather deeply and more broadly impressed at the front margin. This impression does not reach the middle and its posterior margin bears two very blunt angulations.

♀. The head is tuberculated and rugosely punctured, and the pronotum bears a very feeble groove upon its posterior half.

Length 20–26 mm.; *breadth* 10–13·5 mm.

CEYLON: Peradeniya, Colombo.

Type in the British Museum.

261. **Eophileurus decatenatus**, sp. n.

Black and shining, with a very scanty clothing of stiff tawny hairs beneath. The size, shape and general characters are those of *E. cingalensis.* The *pronotum* is coarsely punctured, but less coarsely than in that species, and the punctures are rather scattered upon the hinder part. The *scutellum* is irregularly punctured and the *elytra* are decorated with very coarse annular punctures, as in *E. cingalensis*, but these are arranged irregularly and not in longitudinal lines, the intervening spaces being broken up and without minute punctures. The *pygidium* is closely punctured, becoming rugose at the sides and base. The *metasternum* is decorated at the sides with large horseshoe-shaped impressions, reduced to a few small punctures at the middle.

The sexual characters of the head and thorax are exactly as in *E. cingalensis.*

Length 19·5–21·5 mm; *breadth* 10–11 mm.

Madras: Shembaganur, near Madura.

Type in the British Museum; cotypes in coll. C. Sternberg.

This may possibly prove to be a variety of *E. cingalensis* with irregularly punctured elytra, but I have seen *E. cingalensis* only from Ceylon, where it is fairly common, whereas the present form is represented by four specimens from Southern India.

262. **Eophileurus nilgirensis.**

Eophileurus nilgirensis, *Arrow,* Trans. Ent. Soc. Lond.* 1908, p. 334.

This species is very nearly related to *E. planatus*, Wied., but much less finely punctured, and the prothoracic fovea in the male is circular, extends in well-developed specimens considerably past the middle and is not bounded behind by distinct angulations. The *prothorax* is closely punctured, becoming rugose in front, and the sculpture is only a little coarser than in *E. planatus.* The sides are strongly rounded but the curvature does not quite reach the posterior angles, which are rather sharp. The *scutellum* is irregularly punctured. The *elytra* are closely covered with coarse annular punctures arranged in definite rows and there are a very few minute punctulations in the interstices. The *pygidium* is rugose at the base and scantily punctured at the apex, and the *metasternum* is densely punctured and clothed with long tawny hairs, except in the middle, where it is scantily punctured and bare.

Length 22–24 mm.; *breadth* 12·5 mm.

Madras: Nilgiri Hills, 6000 ft., Shembaganur, near Madura.

Type in the British Museum.

Capt. A. K. Weld Downing found several specimens of this beetle in the interior of a decayed tree *(Ilex whiteana)* but failed to discover any larvæ. Mr. H. L. Andrewes dug up a female in the jungle. Specimens have also been taken upon *Grevillea.*

263. Eophileurus chinensis.

Phileurus chinensis, *Fald.*,* *Mém. Ac. St. Pétersb.* ii, 1835, p. 370, pl. 4, fig. 4.
Trionychus chinensis, *Fairm.*, *Ann. Soc. Ent. France*, 1898, p. 385.
Trionychus poteli, *Fairm.*,* *Ann. Soc. Ent. France*, 1898, p. 384.

Shining black, with the metasternum thickly clothed with reddish hairs. The *pronotum* is depressed in the middle in both sexes, the *scutellum* rugosely punctured, and the *elytra* striated, with close, irregular, annular punctures in the striæ. The *metasternum* is densely rugose except in the middle, where it is punctured, and the *abdomen* is coarsely punctured.

♂. The head is armed with a slender horn, behind which it is smooth, and the pronotum has a large excavation extending from the front to near the hind margin, almost circular in large specimens and elongate in minor ones. The cavity is rugose and the rest of the surface moderately punctured. The pygidium is very convex and smooth and shining, except at the base and in the lateral angles. The inner claw of the front tarsus is very broad and widely cleft.

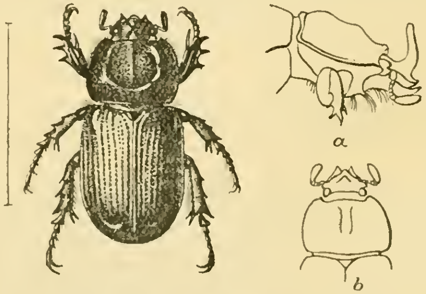

Fig. 67.—*Eophileurus chinensis*, male, and anterior part of male (*a*) and female (*b*).

♀. The head is rugose and has a short sharp tubercle in the middle. The pronotum is coarsely punctured all over and has a narrow longitudinal channel in the middle, extending almost from front to hind margin. The pygidium is rugose, not prominent, and thinly clothed with erect hairs.

Length 20–24 mm.; *breadth* 10–12 mm.

Bhutan; Burma: Ruby Mines; China; Japan.

Type in coll. R. Oberthür, also that of *poteli*.

Mr. George Lewis states that this beetle is found concealed beneath wood, tiles, etc., upon the ground near refuse-heaps, in which no doubt the larvæ live.

Genus CLYSTER.

Clyster, *Arrow, Trans. Ent. Soc. Lond.* 1908, p. 330.

TYPE, *Scarabœus itys*, Oliv. (Malayan Region).
Range. Burma; Malay Peninsula; Java; Borneo, etc.

Form cylindrical. Clypeus produced and truncate in front, the frontal suture bearing a short recurved horn in the male and two tubercles in the female. Mandibles straight at the sides and blunt in front, not produced beyond the clypeus. Front tibia armed with three strong teeth and secondary denticles; middle and hind tibiæ compressed and spinose, digitated at the end. Tarsi moderately slender, the front ones greatly thickened in the male, with the inner claw very broad and cleft at the end. Propygidium rather produced behind, with almost the whole median part finely striated.

The typical species, *Clyster itys*, Oliv., although recorded as Indian in the Munich Catalogue of Coleoptera, appears to be really confined to the Malayan Region and is therefore not included here.

264. Clyster retusus.

Clyster retusus, *Arrow,* Trans. Ent. Soc. Lond.* 1908, p. 330.

Black or piceous, elongate and rather convex. The *head* is coarsely rugose, narrowly produced in front, with the anterior edge nearly straight and slightly reflexed, and the angles scarcely rounded. The *prothorax* is not much shorter than its width,

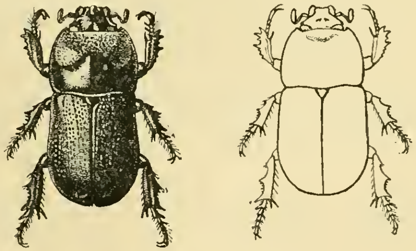

Fig. 68.—*Clyster retusus*, male (natural size) and outline of female.

with the sides gently and uniformly curved, narrowed in front, with the anterior angles acute and the posterior ones rounded; it is smooth in the middle but there are large scattered punctures at the sides. The *scutellum* bears a few small punctures, sometimes forming an angulate line. The *elytra* are closely punctured, the punctures forming four pairs of lines upon each and a single line bordering the suture, and the intervals are closely and irregularly punctured. The *propygidium* is gently produced in the middle and the whole median part covered with fine but broken striæ. The

pygidium is densely punctured, and the punctures, at least at the sides, tend to coalesce transversely.

♂. The cephalic horn is short and nearly straight. The anterior half of the prothorax is scooped out and divided by two smooth oblique carinæ into three areas which are coarsely rugose. The elevated dorsal part ends abruptly in front and is sometimes slightly produced, but it never extends nearly as far as the front margin.

♀. There is a rudimentary excavation at the front margin of the pronotum and two slight tubercles behind it.

Length 21–29 mm.; *breadth* 11–15 mm.

ANDAMAN IS.; BURMA; PENANG.

Type in the British Museum.

Genus **HETERONYCHUS**.

Heteronychus, *Burm., Handb. Ent.* v, 1847, p. 90; *Lacord., Gen. Coléopt.* iii, 1856, p. 406; *Kolbe, Ent. Nachr.* 1900, p. 163.

TYPE, *Geotrupes arator*, F. (S. Africa).

Range. Africa and Southern Asia.

Form shortly cylindrical, not very convex, smooth and shining, and without armature or excavation. Clypeus tapering and generally minutely bidentate in front. Mandible bluntly prominent in front, deeply notched at the outer margin. Maxilla very strong, not hairy, armed with three pairs of strong sharp teeth. Mentum long and narrow, slightly tapering to the end. All the palpi slender. Pronotum very smooth, impunctate, strongly and regularly rounded at the sides and scarcely narrowed to the front. Prosternum forming a free columnar process behind the front coxæ. Propygidium bearing near the middle two longitudinal files composed of short stridulatory ridges. Legs not long, with rather broad and flat tibiæ, the front ones armed with three broad teeth and smaller ones between, the middle and hind tibiæ strongly carinate externally, truncate and fringed with stout spines at the end.

♂. Front tarsi very short and thick, with the claw-joint enlarged and the inner claw broadly dilated, bent inwards and cleft or lobed.

Key to the Species.

1 (4) Pygidium strongly and uniformly punctured.	
2 (3) Punctures of the pygidium very coarse and confluent	*lioderes*, Redt., p. 295.
3 (2) Punctures of the pygidium separate ..	*annulatus*, Bates, p. 295.
4 (1) Pygidium not, or little, punctured.	
5 (8) Elytra punctate-striate.	
6 (7) Sides of the elytra evenly punctured ..	*sublævis*, Fairm., p. 296.
7 (6) Sides of the elytra almost smooth in the middle	*robustus*, sp. n., p. 296.
8 (5) Elytra smooth	*sacchari*, Arrow, p. 297.

265. Heteronychus lioderes.

Heteronychus lioderes, *Redtenbacher,* Reise der Novara, Zool.* ii, *Col.* 1867, p. 75.
Heteronychus poropygus, *Bates,* The Entomologist,* 1891, *Suppl.* p. 19.

Black above, deep reddish brown beneath, and very smooth and shining, elongate-oval in shape and not very convex. The *head* is transversely rugose, except on the vertex, the clypeus armed with two moderately distant reflexed teeth and divided from the forehead by a slight carina interrupted in the middle. The *pronotum* and *scutellum* are entirely smooth and shining, and the *elytra* regularly and deeply punctate-striate, with the subsutural interstice wide and irregularly punctured throughout its length; the apical margins are strongly and irregularly punctured. The *pygidium* is very deeply and coarsely, and more or less confluently, punctured. The *lower surface* is almost entirely smooth, but the anterior angles of the *metasternum* are lightly punctured.

♂. The front tarsus is thick and the inner claw dilated into a convex plate as broad at its extremity as it is long and very inconspicuously cleft.

Length 15–17 mm.; *breadth* 8–9 mm.

NEPAL: Nagorkot, Chanbragiri, Gowchar; BENGAL: Purneah District, Calcutta, Dacca, Sahibganj, Balasor, Sundarbands; ASSAM: Silhet; BURMA: Rangoon; MALAY PENINSULA; JAVA; CELEBES.

Type in the Vienna Museum, that of *poropygus* in coll. R. Oberthür.

This is a very abundant species. It has been taken in numbers at light in November and December.

266. Heteronychus annulatus.

Heteronychus annulatus, *Bates,* The Entomologist,* 1891, *Suppl.* p. 19.
Phileurus curtipennis, *Fairm.,* C. R. Soc. Ent. Belgique,* xxxv, 1891, p. 124.

Black above, deep reddish brown beneath, very smooth and shining, shortly ovate, rather broad behind, and moderately convex. The *head* is rather closely rugose except between the eyes, where it is smooth; the *clypeus* is feebly bidentate in front and separated from the forehead by a slight carina interrupted in the middle. The *pronotum* has a few extremely minute punctures at the sides only, and the *scutellum* is unpunctured. The *elytra* are very strongly punctate-striate, the striæ forming three pairs, and the spaces between the pairs each contain a single row, or part of a row, of punctures, the second interstice containing an irregular aggregation; the apical margins are irregularly punctured. The stridulatory files of the *propygidium* are moderately distant and not very fine, and the *pygidium* is strongly and densely punctured. The *lower surface* is almost smooth.

♂. The inner claw of the front tarsus is dilated, bent, and furnished with a broad basal lobe.

Length 12·5–13 mm.; *breadth* 6·5 mm.

PUNJAB: Kulu; BENGAL: Calcutta.

Type in coll. R. Oberthür; cotypes, and also the type of *curtipennis*, in the British Museum.

267. **Heteronychus sublævis.**

Phileurus sublævis, *Fairm., C. R. Soc. Ent. Belgique*, xxxv, 1891, p. 123; *Arrow, Trans. Ent. Soc. Lond.* 1908, p. 327.

Black, or piceous, broadly elongate-ovate. The *head* is coarsely rugose, with the front bituberculate and rather broad at the anterior margin, which bears two minute tubercles placed near together. The *pronotum* is almost imperceptibly punctured at the sides, with the lateral margins broadly curved and slightly narrowed anteriorly, the front angles acute and the hind angles obtuse. The *scutellum* is smooth. The *elytra* show a vestige of a punctured sutural stria and four pairs of lines of strong punctures, the first two pairs abbreviated behind; there are a few similar punctures in the intervals and the lateral and apical borders are strongly and irregularly punctured. The *propygidium* is scarcely punctured and the stridulating files are rather distant and very finely sculptured. The *pygidium* is finely and densely punctured, except towards the apex. The *front tibia* is furnished with three strong acute teeth and supplementary denticles.

♂. The front tarsus is slightly thickened and the inner claw very short, thick and strongly curved, with a strong basal lobe.

The species resembles *H. punctolineatus*, Fairm., but the marginal tubercles of the clypeus are placed closer together, the pronotum is less visibly punctured, the stridulating files are finer and farther apart, and the pygidium is more finely and closely punctured.

Length 18·5–22 mm.; *breadth* 9·5–13 mm.

ASSAM; BURMA: Rangoon; MALAY PENINSULA.

Type in the Paris Museum.

268 **Heteronychus robustus**, sp. n.

Black or piceous, reddish beneath, smooth and shining, and broadly elongate-ovate in shape. The *head* is coarsely rugose, with two tubercles at the middle, and the *clypeus* bidentate. The *pronotum* is broad, scarcely narrowed in front, with the side margins strongly rounded and the hind angles broadly rounded off. The *scutellum* is smooth, and the *elytra* have a broad smooth strip bordering the suture and rather feeble longitudinal rows of punctures externally, the punctures being obsolete at the middle of the outer margin and strong and irregular at the apical angles. The *propygidium* is finely punctured and provided with two narrow stridulating files, and the *pygidium* is

unpunctured in its apical part and densely punctured towards the sides and base. The *metasternum* is smooth, with a few punctures at the sides, and the *abdomen* entirely smooth.

♂. The front tarsus is short and thick and the inner claw rather long, greatly dilated, straight to beyond the middle and rather narrowly cleft before the extremity, which is truncate.

I have not seen the female.

Length 18 mm.; *breadth* 10·5 mm.

Lower Bengal: Sahibganj (*J. Wood-Mason*), Rajmahal.

Type in the British Museum.

This species is similar in size and sculpture to *H. sublævis*, Fairm., but relatively shorter, with the prothorax less narrowed in front, the hind angles more broadly rounded and the elytral sculpture feebler. The shape of the inner claw of the front tarsus is quite different in the male.

269. Heteronychus sacchari.

Heteronychus sacchari, *Arrow*,* *Trans. Ent. Soc. Lond.* 1908, p. 329.

Black, extremely smooth, and rather short and broad. The *head* is rugose, with an inconspicuous carina before the eyes, broadly interrupted in the middle. The *clypeus* is produced into two rather sharp reflexed teeth. The *prothorax* is closely punctured along the extreme posterior margin, but is otherwise smooth; it is slightly narrowed in front and regularly rounded at the sides, with the front angles acute and the hind angles obtuse. The *scutellum* is small and vaguely punctured at the base. The *elytra* are short, widening a little behind the middle, with faint traces of striæ quite devoid of punctures; there are a very few punctures at the shoulders and the outer margins are very minutely punctulated behind. The *propygidium* is finely punctured and the stridulating files narrow and not reaching the hind margin. The *pygidium* is densely rugose at the base and almost smooth on the apical half. The *front tibia* has three strong acute teeth and intermediate denticles.

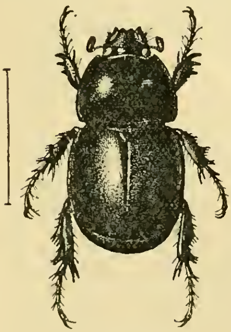

Fig. 69.
Heteronychus sacchari.

In the male the prothorax is rather longer relatively to the elytra and the front tarsus and inner claw are only moderately thickened, the latter not cleft or lobed.

Length 17–19 mm.; *breadth* 11 mm.

Bengal: Rangpur.

Type in the British Museum; cotype in the Indian Museum.

This species is reported as causing considerable injury to Sugar-cane.

Genus ALISSONOTUM.

Alissonotum, *Arrow, Trans. Ent. Soc. Lond.* 1908, p. 322.

Type, *Geotrupes piceus*, F.

Range. Southern Asia.

Ovate or cylindrical in form, convex, smooth and shining. Clypeus attenuated and bidentate in front, the suture represented by a pair of transversely placed tubercles. Organs of the mouth as in *Heteronychus*, the mandibles bilobed externally. Pronotum distinctly punctured and sometimes slightly impressed behind the middle of the front margin, regularly rounded and not closely fringed at the sides. Front tibia tridentate, with minute denticles before and after the uppermost tooth. Hind tibia flattened and spinose and tarsi slender. Propygidium bearing two narrow longitudinal stridulatory files.

The sexes are alike and the front tarsi not thickened, but the inner claw of the male may become very feebly enlarged.

The strongly striated elytra and functional stridulatory files, as well as the rather differently formed hind legs, distinguish this genus from *Pentodon*. In the latter there are sometimes traces of a double series of ridges upon the propygidium, but the files are always very coarse and imperfect and the ridges do not nearly reach the hinder margin of the segment. The recognised species of *Pentodon* are very homogeneous in size and form and are essentially Palæarctic in distribution, whereas the present group consists of smaller species of rather varied form and is apparently confined to Tropical Asia.

Key to the Species.

1	(8)	Pronotum without an anterior marginal pit.	
2	(5)	Pronotum very finely and unequally punctured.	
3	(4)	Body short	*piceum*, F., p. 299.
4	(3)	Body long	*elongatum*, sp. n., [p. 299.
5	(2)	Pronotum coarsely punctured.	
6	(7)	Punctures of the pronotum not crowded at the sides	*rangunense*, sp. n., [p. 300.
7	(6)	Punctures of the pronotum crowded at the sides	*simile*, sp. n., p. 300.
8	(1)	Pronotum having a small anterior marginal pit.	
9	(10)	Pronotum not very coarsely or closely punctured	*impressicolle*, Arrow, [p. 301.
10	(9)	Pronotum very coarsely and closely punctured.	
11	(12)	Hind angles of the pronotum completely rounded	*binodulum*, Fairm., [p. 301.
12	(11)	Hind angles of the pronotum not completely rounded	*crassum*, Arrow, [p. 302.

270. **Alissonotum piceum.**

Scarabæus piceus, *Fab.*,* *Syst. Ent.* i, 1775, p. 14; *Oliv.*, *Ent.* i, 3, 1789, p. 53, pl. 24, fig. 211.
Geotrupes piceus, *Fab.*, *Syst. Eleut.* i, 1801, p. 19.
Heteronychus piceus, *Burm.*, *Handb. Ent.* v, 1847, p. 93.
Phileurus detractus, *Walk.*,* *Ann. Mag. Nat. Hist.* (3) iii, 1859, p. 54.

Very deep red, sometimes black above, broadly ovate, convex, smooth and shining. The *head* is rugose, with a slight transverse carina before the eyes, interrupted in the middle and generally bearing two tubercles placed close together. The *clypeus* is truncate in front, where it bears two reflexed teeth. The *pronotum* is smooth and convex, strongly and regularly rounded at the sides, without anterior impression or elevation, very minutely punctured, the punctures being stronger at the sides but not close. The *scutellum* is smooth and the *elytra* are deeply punctate-striate, the punctures more or less annular; the apical borders are irregularly, and the lateral borders lightly, punctured. The stridulatory files of the *propygidium* vary greatly: they are sometimes continued to the posterior margin, broad and well-developed, and sometimes terminate at a distance from it or are reduced in the hinder part to mere vestiges. The *pygidium* is strongly and deeply punctured, but often smooth at the apical part only or everywhere but the sides. The *metasternum* is smooth, usually with scattered punctures at the sides, and the *abdomen* is unpunctured.

The sexes are alike.

Length 11–13 mm.; *breadth* 6–7 mm.

SIKKIM: Darjiling; BENGAL: Sundarbands, Dacca; MADRAS: Malabar; CEYLON.

Type in the British Museum; also that of *detractus*.

271. **Alissonotum elongatum**, sp. n.

Black, reddish beneath, very smooth and shining, rather elongate and not very convex above, with the greatest breadth behind the middle of the elytra. The *head* is rugose, with two median tubercles and a well-marked depression behind them, and the *clypeus* is bidentate. The *pronotum* is very smooth, finely punctured in the region of the front and hind angles, without anterior impression, well rounded at the sides and scarcely narrowed towards the front. The *scutellum* is smooth and the *elytra* are rather unequally punctate-striate, the punctures moderately large and irregular at the lateral and apical margins. The *propygidium* is finely punctured and the *pygidium* coarsely and closely. The *metasternum* is smooth, with a few punctures at the sides, and the *abdomen* unpunctured.

♂. The inner claw of the front tarsus is sharp and of normal shape, but is a little thickened and has an indication of a basal lobe.

Length 15·5–17·5 mm.; *breadth* 8·5–9·5 mm.
ASSAM: Silhet, Patkai Mts.
Type in the British Museum.

272. Alissonotum rangunense, sp. n.

Black, smooth and shining, rather narrowly elongate and convex. The *head* is rugose, narrow and bidentate in front, with a pair of tubercles placed rather close together in the middle. The *pronotum* is strongly but not closely punctured, without anterior impression or tubercle, and boldly and regularly rounded at the sides. The *scutellum* is smooth and the *elytra* are deeply punctate-striate, the apical margins closely and irregularly punctured and all the punctures annular and rather coarse. The stridulatory files of the *propygidium* are rather divergent and the *pygidium* is coarsely but not very closely punctured. The *lower surface* is almost smooth, but there are a few large punctures at the sides of the *metasternum*.

♂. The inner claw of the front tarsus is a little thickened and strongly bent.

Length 9–11 mm.; *breadth* 4·5–6 mm.
BURMA: Pegu, Rangoon.
Type in the British Museum.

This is one of the smallest known DYNASTINÆ and the smallest dealt with in this volume. It is extremely like *Alissonotum cribratellum*, Fairm., from Cochin China and the Malay Peninsula, in which the front claws are perfectly normal and similar in both sexes.

273. Alissonotum simile, sp. n.

Black, smooth and shining, convex and elongate-oval. The *head* is like that of *A. rangunense*, but the ante-ocular ridges are a little more prominent. The *pronotum* is strongly punctured and the punctures are dense at the sides. There is no anterior impression or tubercle. The *scutellum* is smooth and the *elytra* are very coarsely and deeply punctured in rows, the apical margins being closely and irregularly punctured. The stridulatory files of the *propygidium* diverge rather strongly at their ends and the *pygidium* is coarsely and rather closely punctured. The *lower surface* is nearly smooth, but there are some large punctures at the sides of the *metasternum*.

The front claws are alike in both sexes.

Length 10–11 mm., *breadth* 5·5–6 mm.
ASSAM: Silhet, Dilkoosha; BENGAL: Pusa.
Type in the British Museum.

This species is extremely like *A. rangunense* and *A. cribratellum*. It is a shade larger and less elongate than the former, the punctures of the elytra are rather coarser, those of the pronotum more crowded at the sides and those of the pygidium rather more

numerous and close in the middle. The ante-ocular ridges are a little more prominent. In the male the inner anterior claw is quite simple. The genitalia of all these species are quite different in the male.

274. Alissonotum impressicolle.

Alissonotum impressicolle, *Arrow*,* *Trans. Ent. Soc. Lond.* 1908, p. 323.

This is almost of the same size and shape as *A. piceum*, F., but a very little larger and more elongate. It is black and shining, with the legs and underside piceous. The *head* is closely rugose, bituberculate in front and armed on the vertex with two tubercles placed moderately far apart. The *prothorax* is very distinctly but not closely punctured, the punctures being finer in the middle. There is a faint impression just behind the middle of the front margin and a slight elevation in front of it. The *scutellum* is broad and unpunctured. The *elytra* have each a very deep, not distinctly punctured sutural stria and four pairs of strongly punctured striæ, the first and seventh interstices being irregularly punctured and the third and fifth having each an incomplete line of punctures; the outer and apical margins are strongly and closely punctured. The *propygidium* is slightly produced and bears a pair of fine and moderately broad files. The *pygidium* is strongly but not closely punctured.

The sexes are alike.

Length 14 mm.; *breadth* 8 mm.

Burma: Bhamo, Teinzo (*L. Fea*); Tonkin.

Type in the Genoa Museum.

275. Alissonotum binodulum.

Phileurus binodulus, *Fairm.*,* *C. R. Soc. Ent. Belgique*, xxxv, 1891, p. 124.

Black, reddish beneath, very smooth and shining, convex and rather broadly oval, the elytra widening almost to the end. The *head* is rugose, bidentate in front, and provided with two median tubercles. The *pronotum* is coarsely and rather closely punctured, except in the middle, where there is a slight anterior impression and a minute elevation immediately in front of it; the sides are strongly curved and the hind angles completely rounded off. The *scutellum* is smooth and the *elytra* are short and rather broad posteriorly, deeply striated, with the striæ coarsely punctured; the subsutural interval is broad and has a few punctures, and the apical margins are irregularly punctured. The *propygidium* is produced, and the *pygidium* finely punctured in the middle and closely at the sides. The *metasternum* and *abdomen* are almost smooth.

The sexes are alike.

Length 17 mm.; *breadth* 10 mm.

KASHMIR: Gurais Valley, 7000 ft., Sonamarg; PUNJAB: Kulu.

Type in the British Museum.

A female specimen, originally in the Rothschild collection and generously presented by Herr Chr. Sternberg to the British Museum, appears to be the type of the species.

276. Alissonotum crassum.

Alissonotum crassum, *Arrow*,* *Trans. Ent. Soc. Lond.* 1908, p. 323.

This is a large, black, oval insect. The *head* is coarsely rugose and bituberculate above. The *prothorax* is closely punctured, the punctures being coarse except along the middle, where they are fewer and finer. There is a faint impression near the middle of the anterior margin and a minute elevation in front of it. The lateral margins are well rounded, but the hind angles are not entirely obliterated. The *scutellum* is broad and smooth. The *elytra* are deeply striated, the sutural stria being scarcely punctured and the remainder rather strongly so; the sub-sutural interval is very broad and irregularly punctured, and the third and fifth have each an incomplete line of punctures; the outer margins are finely, and the extremities coarsely, punctured. The *propygidium* is produced in the middle and bears two long and finely striated files; the remainder of the surface is finely rugose and pubescent. The *pygidium* is finely punctured in the middle and rugosely at the sides.

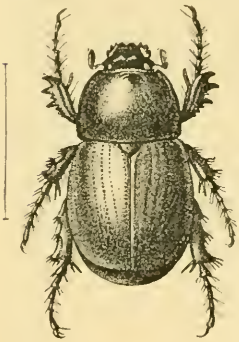

Fig. 70.—*Alissonotum crassum.*

The sexes are alike.

Length 19–21 mm.; *breadth* 11 mm.

BENGAL: Rajmahal; ASSAM: Silhet; BURMA: Bhamo; TENASSERIM.

Type in the British Museum.

Genus PENTODON.

Pentodon, *Hope, Coleopterist's Manual*, 1837, i, p. 92; *Burm., Handb. Ent.* v, 1847, p. 102; *Lacord., Gen. Coléopt.* iii, 1856, p. 410.

TYPE, *Geotrupes punctatus*, Villers (S. Europe).

Range. Southern Europe, Western and Central Asia, Eastern Africa.

Body broadly oval and very convex. Clypeus rather elliptical, narrowing to the front, the head armed in the middle with one or

two minute tubercles. The mandible is trilobate at the outer edge. Maxilla rather slender, bifid at the end, with two or three inferior teeth. Mentum moderately long, feebly notched in front. Prosternal process erect and very hairy. Pronotum subglobose and strongly punctured. Elytra closely and irregularly punctured, sometimes with inconspicuous striæ. Stridulatory files absent, or coarse and incomplete. Legs stout, the front tibia armed with three strong teeth and two or three secondary denticles; the hind tibia not flattened, but truncate at the end and fringed with numerous close short spines. Tarsi short, the basal joint of the hind tarsus flattened and triangular.

The sexes are alike.

This genus differs from *Alissonotum* by its rounder clypeus, the irregularly punctured elytra and the absence or partial atrophy of the stridulatory files. It is essentially Palæarctic in its distribution, and the new species here described from Bengal is abnormal in its appearance as well as its habitat and is only provisionally assigned to the genus.

Key to the Species.

1 (2)	Frontal carina bearing a small tubercle in the middle: elytra of moderate length ..	*bispinifrons*, Reitter, [p. 303.
2 (1)	Frontal carina without a tubercle: elytra very short	*bengalense*, sp. n., [p. 304.

277. Pentodon bispinifrons.

Pentodon bispinifrons, *Reitter*,* *Deutsche Ent. Zeitschr.* 1894, p. 45.

Black and moderately shining, reddish beneath, broadly oval and very convex. The *head* is densely rugose and the clypeus rather elliptical, with the sides contracted but a little rounded, and the front margin armed with two acute reflexed teeth. There is a slight transverse carina, a little angulated at the middle, where it bears a small rather sharp tubercle. The *pronotum* is strongly and rather thickly punctured, with an imperfect smooth longitudinal line at the middle; the sides are strongly and uniformly curved and the hind angles completely rounded off. The *elytra* are thickly and almost rugosely, but not very coarsely, punctured, with a deep sutural stria and three pairs of punctured striæ, the intervening spaces being broad. The *propygidium* is finely punctured and setose, and has a pair of coarse and more or less imperfect stridulatory files, the *pygidium* being closely punctured at the base and feebly at the apex. The *lower surface* is smooth except at the sides.

Length 16–22 mm.; *breadth* 9–12 mm.

PUNJAB: Bannu (*Dr. Pennell*); BALUCHISTAN; SIND: Karachi; PERSIA; TURKESTAN.

Type in the Vienna Museum; cotype in the British Museum.

278. **Pentodon bengalense**, sp. n.

Black or piceous above and reddish beneath, with a few tawny hairs on the lower surface. The body is broadly ovate and convex and the elytra are only a little longer than the head and prothorax together. The *head* is finely rugose, with the clypeus short and tapering, sharply bidentate in front and separated from the forehead by a fine carina, which is angulate in the middle. The *pronotum* is broad and convex, strongly and rather closely and evenly punctured, with the hind margin a little impressed on each side. The *scutellum* is very short, smooth and slightly impressed in the middle of the base. The *elytra* are short and unequally punctured, the larger punctures forming rows upon the disc and those at the sides and apices being fine, close and irregular. The *propygidium* is irregularly granulated and setose. The *pygidium* is finely and rugosely punctured near the base and nearly smooth at the apex. The *metasternum* and *abdomen* are smooth in the middle and finely rugose at the sides. The *legs* are stout and the tarsi slender. The *front tibia* bears three very strong teeth and two or three secondary denticles.

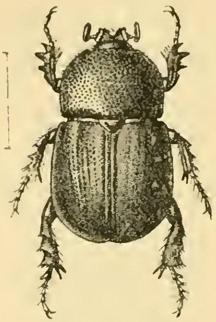

Fig. 71.—*Pentodon bengalense.*

Length 13–14 mm.; *breadth* 8 mm.

Bengal: Pusa (March), Rajmahal.

Type in the British Museum; cotype in coll. R. Oberthür.

I have seen only female specimens, one of them found underground.

Genus MICRORYCTES.

Microryctes, *Arrow, Trans. Ent. Soc. Lond.* 1908, p. 324.

Type, *Microryctes kanarensis*, Arrow.

Range. Tropical Asia.

Elongate-oval and convex. Clypeus attenuated in front, with the margin feebly notched and reflexed. Mandibles strongly notched externally. Front transversely carinate with a single slight median tubercle. Prothorax simple, punctured, and bearing a rather long hairy fringe at the sides. Elytra membranous at the apical margins. Front tibia 3- or 4-dentate, without intermediate denticles. Front tarsi slender and claws equal in both sexes. Propygidium without stridulating files.

Key to the Species.

Apical margin of elytron straight and membranous fringe inconspicuous	*monodon*, Fairm., [p. 305.
Apical margin of elytron slightly oblique and membranous fringe distinct	*kanarensis*, Arrow, [p. 305.
Apical margin of elytron strongly oblique and membranous fringe conspicuous	*apicalis*, Arrow, [p. 306.

279. Microryctes monodon.

Heteronychus monodon, *Fairm., Ann Soc. Ent. Belgique*, 1893, p. 313.

Shining black above and reddish beneath, rather narrowly oval and convex. The *head* is moderately finely rugose and hardly visibly notched at the apex. The *pronotum* is convex and sparingly and extremely finely punctured, except at the sides, where the punctures are moderately coarse. The *scutellum* is unpunctured but lightly impressed along the middle line. The *elytra* are very strongly punctate-striate, with the intervals smooth and nearly equal, except the subsutural one, which is wide at the base and contains a few irregular punctures; the outer and apical margins are closely and irregularly punctured; there is a minute membranous fringe traceable at the inner part of the apical margin, which is not oblique. The *propygidium* is very finely punctured and the *pygidium* very strongly and confluently so. The body is slightly setose at the sides beneath, and the sides of the *metasternum* are strongly punctured.

♂. There is a slight angular indentation at the middle of the front margin of the pronotum.

Length 13–16·5 mm.; *breadth* 7–8·5 mm.

Burma: Rangoon; Siam; Cochin China.

Type in the Paris Museum.

280. Microryctes kanarensis.

Microryctes kanarensis, *Arrow*,* *Trans. Ent. Soc. Lond.* 1908, p. 324.

Rather elongate, black, shining and strongly sculptured. The *head* is strongly and rugosely punctured, with the front of the clypeus feebly bifid and the frontal tubercle not very strong. The *prothorax* has very minute scattered punctures on the disc and these become rather abruptly coarse at the sides. The *scutellum* is unpunctured and longitudinally impressed down the middle. The *elytra* are very strongly striate-punctate, all the interstices being unpunctured and nearly equal, except the juxtasutural strip, which is narrow. The sides and apices are strongly and irregularly punctured. The apical margins are slightly truncated obliquely at the inner half and continued as a

membranous flange. The *propygidium* is very finely and sparingly punctured and the *pygidium* very coarsely and thickly. The front tibia is furnished with three strong pointed teeth and a vestige of a fourth upper one.

Length 15 mm.; *breadth* 8 mm.

BOMBAY: Kanara (*T. R. D. Bell*).

Type in the British Museum; cotype in coll. H. E. Andrewes.

281. Microryctes apicalis.

Microryctes apicalis, *Arrow*,* *Trans. Ent. Soc. Lond.* 1908, p. 325.

This species is very like the preceding, but smaller, and the *prothorax* is relatively narrower, the front angles sharper and the hind angles less broadly rounded. The *elytra* are very coarsely and deeply punctate-striate, and the membranes to which their apices become abruptly reduced are broad and conspicuous. The *pygidium* is very strongly punctured, and the *front tibia* sharply tridentate without trace of an additional tooth as in the other two species.

Fig. 72.—*Microryctes apicalis.*

Length 11·5 mm.; *breadth* 6·5 mm.

BURMA: Karen Hills, 2700–3300 ft. (*L. Fea*).

Type in the Genoa Museum; cotype in the British Museum.

Genus PHYLLOGNATHUS.

Phyllognathus, *Eschsch.*, *Bull. Soc. Moscou*, 1830, p. 65; *Lacord.*, *Gen. Coléopt.* iii, 1856, p. 429.
Oryctes, *subg.* Phyllognathus, *Burm.*, *Handb. Ent.* v, 1847, p. 187.
Oryx, *Guér.*, *Voy. de la Coquille*, ii, 2, 1838, p. 80.

TYPE, *Geotrupes silenus*, F. (Southern Europe).

Range. Southern Europe, West Africa, South-Western Asia and India.

Form short and rotund, with the abdomen, except the last two segments, contracted beneath and the legs of moderate length, the front tibia 3-toothed, the middle and hind tibiæ truncate at the extremity and fringed with closely set short spines. Tarsi stout, with the basal joint in the posterior legs broadly triangular. Clypeus triangular, rounded and recurved at the apex. Mandibles largely exposed, broadly rounded at the sides, with the points not sharp nor produced. Maxilla reduced and unarmed, with stout

palpus. Labium elongate, narrow and pointed in front. Prosternal process free, prominent and rather pointed. Propygidium without stridulatory ridges.

♂. Shorter and more globose than the female. Head armed with a short, flattened and recurved horn, and pronotum excavated in the middle.

Only one Indian species has been described.

282. Phyllognathus dionysius.

Scarabæus dionysius, *F., Ent. Syst.* i, 1792, p. 20.
Geotrupes dionysius, *F., Syst. Eleut.* i, 1801, p. 17.
Oryctes haworthii, *Hope, Gray's Zool. Miscellany*, 1831, p. 22.
Oryctes dionysius, *Burm., Handb. Ent.* v, 1847, p. 188.
Xylotrupes reductus, *Walker, Ann. Nat. Hist.* (3) iii, 1859, p. 54.

Chestnut-red, shining above and clothed with tawny hairs beneath.

It is a compact globose insect. The *head* is densely punctured and the clypeus bluntly pointed. The *prothorax* is transverse, strongly rounded at the sides, with the front angles obtuse, the hind angles little marked, and the base feebly prominent in the middle. The *scutellum* is broad, and rugose except at the extreme margins, and the *elytra* are rather indefinitely punctate-striate, with coarse irregular punctures in the intervals.

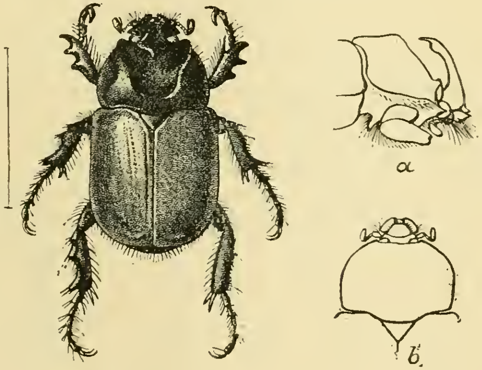

Fig. 73.—*Phyllognathus dionysius*, male, and outlines of anterior part of male (*a*) and female (*b*).

♂. The cephalic horn is broad, smooth beyond the base, strongly reclined, and in well developed specimens dilated at the end and obtusely triangular at the extremity. The prothorax is deeply excavated from the front almost to the hind margin, and the sides of the excavation are almost straight, diverging gently to the front, slightly carinate anteriorly and produced on each side

into a slight tooth just behind the front margin and a still slighter one at the middle. The cavity is rugose and the remaining surface of the pronotum smooth and minutely punctured. The pygidium is smooth, convex and very thinly and minutely punctured.

In less developed males the cephalic horn is shorter and tapers to a sharp point without any dilatation at the end. and the prothoracic excavation is smaller.

♀. This is more elongate and generally larger. There is a small sharp tubercle upon the vertex, directed backwards. The pronotum is entirely convex and punctured, the punctures being distinct at the sides and base, and very dense and confluent in front and in the middle. The pygidium is not very convex and is punctured and thinly clothed with erect hairs.

Length 16–24 mm.; *breadth* 10–14 mm.

SIKKIM: Karsiang; BENGAL; Purneah District, Chota Nagpur, Calcutta; BOMBAY: Belgaum; MADRAS: Berhampur, Mysore; CEYLON.

This beetle is destructive in its larval stage to rice-crops and has been described and figured in all its stages by Mr. H. Maxwell Lefroy in 'Indian Insect Life,' 1909. Specimens sent from the rice-fields were reared in captivity by Mr. Lefroy in soil in which rice-plants were growing, upon the roots of which they fed. The following is an outline of the life-history:—

The egg is white and soft; when first laid it is oval, being 2 mm. in diameter. It grows larger day by day until it is nearly round and 3 mm. in diameter, the increase in weight being from ·04 grain to ·16 grain, due probably to the absorption of moisture. The larva is of the typical form, a full grown one measuring 36 mm. by 6 mm. The larvæ live in the soil, feeding upon the roots of the rice, and there is no indication of their presence but pellets of earth thrown up near the plants. When full grown they burrow down a foot and make cells of consolidated earth, which are smooth inside. They then pupate. The periods are as follows:— The eggs are laid during June and July, and hatch in five to eight days. The larvæ feed during July, August, and September; they then pupate, the pupal period being eight days only. The beetles rest in the soil till May, when they become active, burrow out, fly, mate, and lay eggs. From eight females only thirty-four eggs were obtained, but perhaps all did not lay eggs. This curious life-history is an adaptation to the climate. Some showers fall in May, before the monsoon. and the beetles then emerge; the monsoon breaks in June and then the eggs are laid, the larvæ finding plenty of food and soft moist earth; the period from November to May is dry, the earth being hard and no rice available.

Mr. Lefroy has never heard this species make any sound.

Genus PODALGUS.

Podalgus, *Burm., Handb. Ent.* v. 1847, p. 117; *Lacord., Gen. Coléopt.* iii, 1856, p. 408; *Arrow, Trans. Ent. Soc. Lond.* 1908, p. 340.
Vertumnus, *Reiche, Ann. Soc. Ent. France*, 1859, p. 10.
Crator, *Semenow, Horæ Soc. Ent. Ross.* 1890, p. 207.—Type, *P. infantulus*, Sem.

Type, *Podalgus cuniculus*, Burm. (W. Africa).

Range. Northern Africa and Western Asia.

Body convex and ovate, with the head and prothorax rather small and without armature. Clypeus short, tapering to a point and separated from the forehead by a transverse carina. Mandible narrow in front and having two rounded lateral lobes. Maxilla long, slender and without teeth. Labium bulging beneath and tapering to a very sharp point. Last joint of all the palpi long and thick. Prosternal process long, free and erect. Propygidium bearing two longitudinal stridulatory files. Legs not long, the hind ones short and their femora much inflated. Front tibia armed with three very strong teeth; middle and hind tibiæ very short, truncate at the end and fringed with minute spines, the two spurs very broad and leaf-like; hind tibia regularly and strongly dilated from base to extremity. Tarsi slender, those of the hind legs short, with the basal joint strongly triangular.

The sexes are alike.

One species only is known to enter India.

283. Podalgus infantulus.

Crator infantulus, *Sem., Horæ Soc. Ent. Ross.* 1890, p. 207.

Chestnut-red, with a few reddish hairs on the sternum; elongate and very convex. The *head* is transversely rugose, with rather prominent anteocular ridges. The *pronotum* is strongly and densely punctured, boldly and uniformly rounded at the sides, with the angles obsolete. The *scutellum* is smooth, and the *elytra* are rather feebly and irregularly punctured, some of the punctures forming imperfect rows; the apical angles are right angles. The stridulatory files are rather divergent and do not quite reach the hind margin of the *propygidium*. The *pygidium* is very minutely and thinly punctured in its apical part, and densely and rugosely at the base. The *metasternum* is slightly punctured and hairy at the sides, and the *abdomen* very smooth.

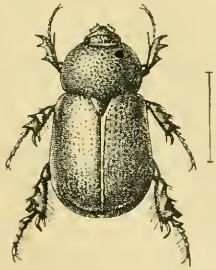

Fig. 74.
Podalgus infantulus.

Length 11–13 mm.; *breadth* 6–7 mm.

Punjab (*Dr. Pennell*); Bokhara.

Type in coll. Semenow.

Genus DIPELICUS.

Dipelicus, *Hope, Trans. Ent. Soc. Lond.* iv, 1845, p. 7; *Burm., Handb. Ent.* v, 1847, p. 179; *Waterh., Trans. Ent. Soc. Lond.* v, 1867, p. 531.

Horonotus, *Burm., Handb. Ent.* v, 1847, p. 178; *Lacord., Gen. Coléopt.* iii, 1856, p. 421.—Type, *Scarabæus dædalus*, F. (n. syn.).

Camelonotus, *Fairm., Ann. Soc. Ent. Belg.* 1883, p. 14; *Heller, Notes Leyd. Mus.* xix, 1897, p. 163 (n. syn.).

Palmerstonia, *Blackb., Proc. Linn. Soc. N. S. Wales*, 1888, p. 855. —Type, *P. bovilli*, Blackb. (Australia).

Neodipelicus, *Ritsema, Notes Leyd. Mus.* ix, 1887, p. 215.—Type, *Dipelicus nasutus*, Bates (D. of York I.).

Type, *Dipelicus cantori*, Hope (Java).

Range. Tropical Asia, Polynesia and Australia.

Form very convex and moderately elongate, with rather short legs. Head vertically truncate in front, with two slight teeth at the lower edge and an elevated carina at the upper edge of the truncature. Pronotum very convex above, with all the angles blunt. Elytra sharply rectangular at the posterior angles. Propygidium more or less lobed behind and bearing a broad stridulatory file at the middle. Pygidium smooth and shining. Prosternum forming a free columnar process behind. Femora short and broad, the hindmost very large, subglobose. Front tibia armed with three very strong and sharp teeth occupying nearly the whole outer edge. Four posterior tibiæ short, rapidly dilating, and truncate at the extremity, where they are fringed with short close-set bristles. Front tarsi very long and slender. Middle tarsi moderately short. Hind tarsi very short, with the first joint broadly triangular. All the claws minute. Spurs of the hind tibia broad and leaf-like. Mandible small, not exposed externally, and without teeth or notches. Maxilla rather long, not very hairy, with six very sharp teeth internally; the palpus rather slender. Labium long, with the terminal part almost quadrate and the palpi short, the basal joints minute and the terminal joint large and globose.

♂. The vertical front of the head is sharply acuminate above. The pronotum is deeply excavated in front and the hind margin of the cavity produced. The propygidium is greatly produced behind, encroaching upon the pygidium.

♀. The frontal carina is more or less notched in the middle.

I have merged several supposed genera under the common name of *Dipelicus*, the various types passing one into the other. The only differences pointed out by the authors are sexual features of no value for generic division. Thus *Neodipelicus* is based upon females only, and the type of *D. nasutus*, Bates, although said to be a male, is evidently a female.

Key to the Species.

1 (4) Pronotum with a distinct posterior marginal line.
2 (3) Elytra shining and little punctured .. *hircus*, F., p. 311.
3 (2) Elytra rather closely striate-punctate. *lacordairei*, Sharp, p. 312.
4 (1) Pronotum without a distinct posterior marginal line.
5 (6) Stridulatory ridges of the propygidium very fine anteriorly .... *cantator*, sp. n., p. 313.
6 (5) Stridulatory ridges of the propygidium very coarse anteriorly .... *bidens*, sp. n., p. 313.

284. **Dipelicus hircus.**

Scarabæus hircus, *F.*, *Syst. Ent.* i, 1775, p. 13; *Ent. Syst.* i, 1792, p. 21.
Geotrupes hircus, *F.*, *Syst. Eleut.* i, 1801, p. 18.
Oronotus hircus, *Har.*, *Coleopt. Hefte*, viii, 1871, p. 121.
♂. Scarabæus xantus, *Oliv.*, *Ent.* i, 3, 1789, p. 180, pl. 27, fig. 235.
♀. Scarabæus diadema, *Oliv.*, *Ent.* i, 3, 1789, p. 181; *l. c.* i, 5, pl. 5, fig. 53.
♂. Scarabæus dædalus, *F.*, *Ent. Syst.* i, 1792, p. 7.
Geotrupes dædalus, *F.*, *Syst. Eleut.* i, 1801, p. 7.
Horonotus dædalus, *Burm.*, *Handb. Ent.* v, 1847, p. 178.
♂ ♀. Callicnemis eximius, *Guér.*, *Voy. Favor.* v, 1839, p. 134, pl. 40, fig. 2.
Xylotrupes solidipes, *Walk.*, *Ann. Nat. Hist.* (3) iii, 1859, p. 54.

Chestnut-red, thinly clothed with tawny hairs beneath; cylindrical and convex in shape. The *head* is smooth, the *pronotum* coarsely punctate-rugose, with the sides smoother, the lateral

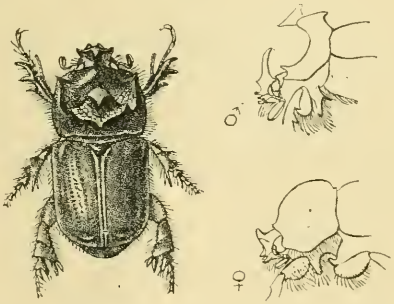

Fig. 75.—*Dipelicus hircus*, male, natural size, with lateral view of head and thorax of male (above) and female (below).

margins strongly curved and the base gently curved and bearing an impressed marginal line. The *scutellum* is smooth and the

elytra smooth and shining, with a few coarse punctures in imperfect rows. The apical angles are sharp and slightly produced inwards. The *propygidium* has a graduated series of stridulatory ridges at the middle, very fine posteriorly and becoming very coarse towards the anterior margin of the segment. The *pygidium* is finely punctured.

♂. The clypeal shield of the head is produced above into a sharp-pointed short horn, slightly curving backwards. The pronotum is very deeply excavated, and the cavity is nearly smooth and gives rise at its hind margin to a short elevation limited behind by a carina, which is semicircular or (at its greatest development) sharply angular; above the cavity the pronotum is rugosely punctured and produced forward as a broad horizontal lamina, rapidly narrowing, truncate in front and abruptly reflexed. The propygidium is produced at the middle almost to the extremity of the pygidium.

♀. The clypeal shield is shortly bidentate above, and the pronotum coarsely punctate-rugose, with the marginal part smooth, rather abruptly sloping just before the hind margin and very convex above.

Length 19–22 mm.; *breadth* 10–12 mm.

Madras: Pondichery, Tranquebar; Ceylon.

285. **Dipelicus lacordairei.**

Horonotus lacordairei, *Sharp, Rev. et Mag. Zool.* 1873, p. 270.

Chestnut-red, clothed with tawny hairs beneath, cylindrical and very convex in shape. The *head* is smooth and the *pronotum* very coarsely rugose (some large irregular pits being distinguishable in the median part), strongly rounded at the sides, with the base gently curved and bearing a distinct impressed marginal line and all the angles very blunt. The *scutellum* is smooth and the *elytra* are strongly and uniformly punctured, most of the punctures forming deeply impressed double rows; the apical angles are sharp and slightly produced inwards. The *propygidium* is produced behind and the median part covered with stridulatory ridges, extremely fine anteriorly and becoming coarse at the hind margin. The *pygidium* is finely punctured.

♂. The head and pronotum are armed as in *D. dædalus*, but the cavity of the latter is deeper on each side. The propygidium is produced almost to the end of the pygidium.

♀. The clypeal shield is bluntly bidentate above, and the pronotum less closely rugose in front and at the sides but not behind, and scarcely sloping there.

Length 22–23 mm.; *breadth* 10–12 mm.

Burma: Arakan; Malay Peninsula.

Type in coll. R. Oberthür.

286. **Dipelicus cantator**, sp. n.

Chestnut-red, with the head and pronotum rather darker and the legs and lower surface clothed with long tawny hairs.

The *clypeus* is bidentate and the *head* rather shining and armed with a strong transverse carina at the middle. The *pronotum* is densely covered with very large and partially coalescent pits, which become obliterated at the sides, the lateral margins are strongly rounded and the posterior margin trisinuate, without a distinct marginal line. The *scutellum* is smooth and the *elytra* are rather closely and shallowly punctured with moderately fine pits, some of which form four double rows; the apical angles are produced inwards, forming sharp overlapping tongues. The *propygidium* is finely but not very deeply or regularly striated upon its posterior part and bears anteriorly several transverse bands which are extremely finely and sharply striated. The *pygidium* is smooth and shining in the middle and rugose at the sides. The *abdomen* is shining and thinly hairy beneath. The *front tibia* is slender and armed with three very sharp teeth, and the *front tarsi* are extremely long. The four *posterior legs* are of moderate length.

♂. The cephalic carina forms a very short sharp horn and the pronotum is excavated and smooth in its anterior half, the posterior margin of the cavity bearing two small vertical tubercles placed at a short distance apart.

Length 20 mm.; *breadth* 11 mm.

BENGAL: Berhampur (*Atkinson*).

Type in the British Museum.

I have seen only a single male specimen.

287. **Dipelicus bidens**, sp. n.

Chestnut-red, with the upper surface black and the legs and lower surface clothed with tawny hairs. The *clypeus* is bidentate, the *head* scarcely punctured and bearing a strong transverse carina at the middle. The *pronotum* is very closely and coarsely pitted, the pits coalescent and indistinct except in the posterior median part; the lateral margins are very strongly curved and the base strongly trisinuate, without a distinct marginal line. The *scutellum* is smooth and the *elytra* are rather closely and shallowly punctured with moderately fine pits, some of which form four double rows; the apical angles are a little produced inwards. The *propygidium* bears stridulatory ridges, which are extremely coarse in the anterior, and moderately fine in the posterior, part. The *pygidium* is smooth and shining in the middle and rugose at the sides. The *legs* are stout with the *front tibiæ* not very slender nor the teeth sharp, but the *front tarsi* are very long.

♂. The cephalic carina is produced upwards into a short sharp horn. The pronotum is broadly excavated in front (the excavation

extending backwards beyond the middle in a well-developed specimen), the cavity almost smooth and its posterior margin bearing two slight vertical tubercles placed close together.

♀. The cephalic carina is rounded above and scarcely visibly notched in the middle. The pronotum is relatively narrower than in the male, convex above and entirely coarsely rugose, with an

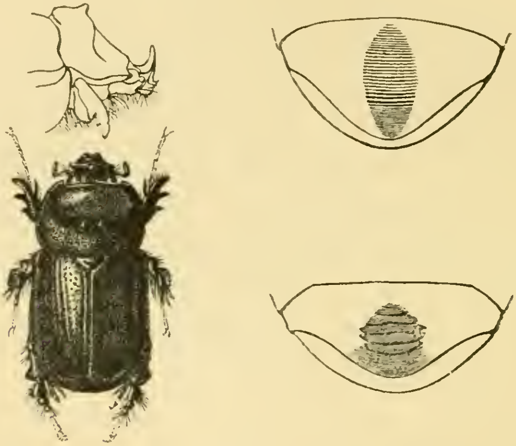

Fig. 76.—*Dipelicus bidens*, male, natural size, with lateral view of the anterior part and diagrammatic figures of the stridulating files of *D. bidens* (above) and *D. cantator* (below).

indication of a very narrow smooth median longitudinal line. The propygidium is a little less produced and the pygidium is prominent and feebly granulated, except a small median area.

Length 31 mm.; *breadth* 16 mm.

Ceylon: Kandy.

Type in the British Museum.

A single male has been presented to the Museum by Mrs. Christopher Morris. There is a female from the same locality in Herr C. Sternberg's collection and one has been sent to me by Mr. H. Maxwell Lefroy. In M. Réné Oberthür's collection are a male and female from the Castelnau collection bearing the locality Madras. They are smaller and uniformly reddish in colour, but in other respects agree with the type.

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All names printed in italics are synonyms.
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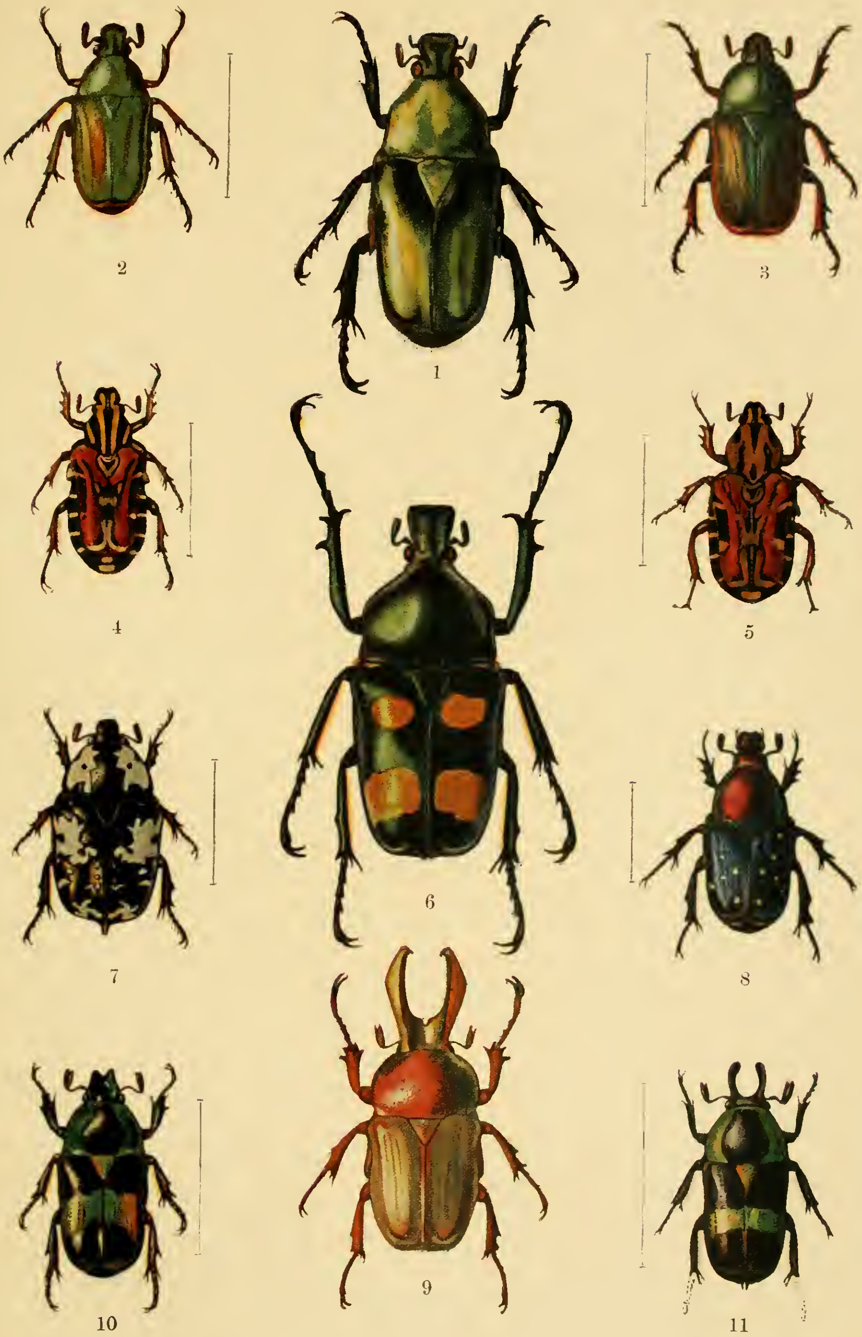

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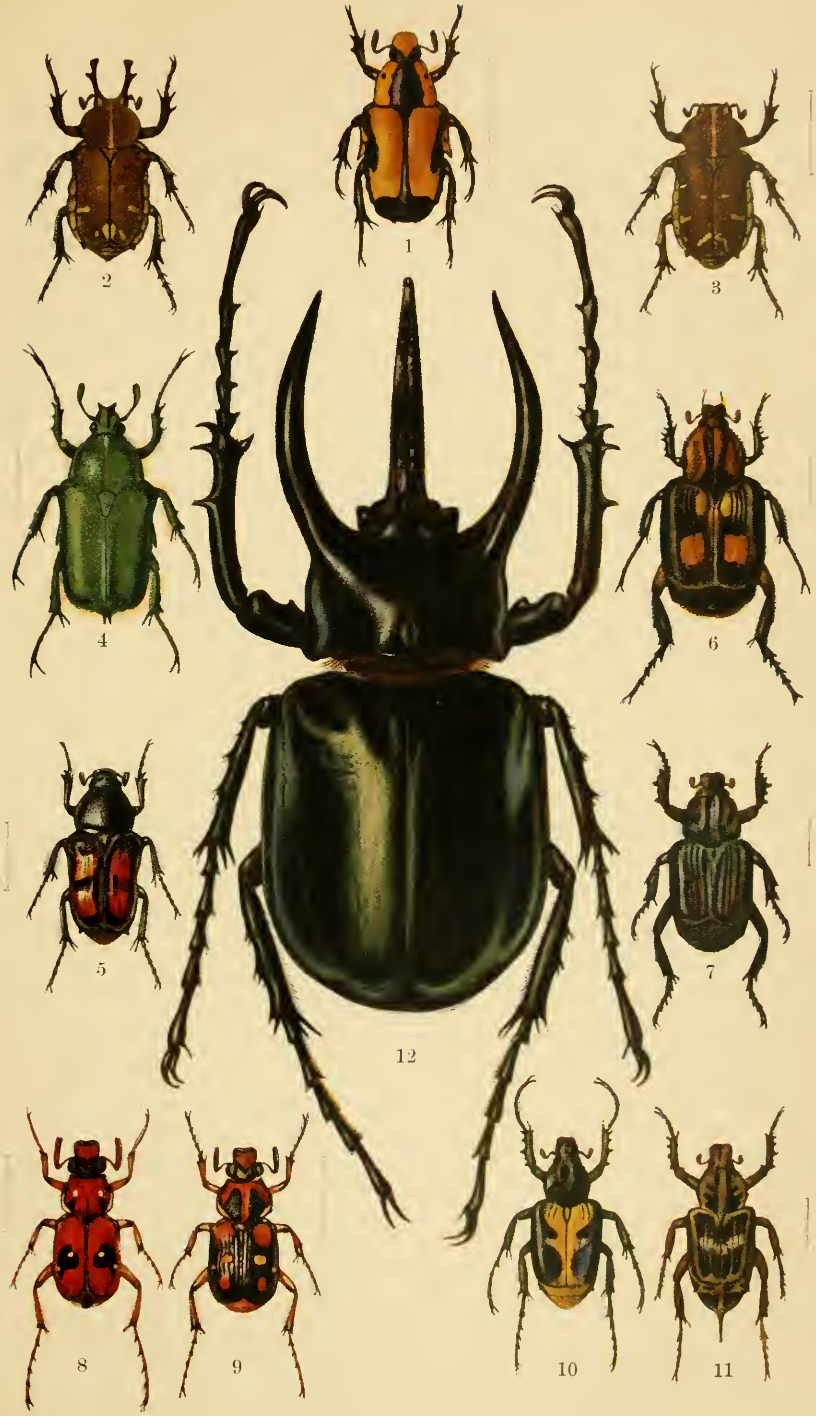

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